REPORT RESUMES

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A STUDY OF OFF-FARM AGRICULTURAL OCCUPATIONS IN NEW YORK STATE.

BY- CUSHMAN, HAROLD R. AND OTHERS
STATE UNIV. OF N.Y., ITHACA

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THE STUDY ATTEMPTED TO DETERMINE (1) WHAT THE OFF-FARM AGRICULTURAL OCCUPATIONS WERE, (2) THE PROPORTION OF TIME DEVOTED TO USE OF AGRICULTURAL COMPETENCIES IN THESE OCCUPATIONS, (3) THE NUMBER OF PERSONS EMPLOYED IN SUCH OCCUPATIONS, (4) THE LEVELS OF EMPLOYMENT IN WHICH OCCUPATIONS ARE FOUND, (5) THE OUTLOOK FOR EMPLOYMENT OPPORTUNITIES IN THESE JOBS, (6) THE AGRICULTURAL COMPETENCIES NEEDED BY THE WORKERS, AND (7) THE EDUCATIONAL REQUIREMENTS FOR SUCH OCCUPATIONS. A STRATIFIED-RANDOM SAMPLE OF THE POPULATION INCLUDED 16 OF THE 260 SCHOOL DISTRICTS IN NEW YORK STATE OFFERING INSTRUCTION IN AGRICULTURE DURING THE SCHOOL YEAR 1963-64 AND TWO SELECTED SCHOOL DISTRICTS OUT OF SEVERAL LOCATED IN THE ADIRONDACK AREA. A TOTAL OF 541 BUSINESSES OR SERVICES IN THE 16 SCHOOL DISTRICTS AND 53 BUSINESSES IN THE ADIRONDACK AREA WERE INTERVIEWED. SOME CONCLUSIONS WERE--(1) OFF-FARM AGRICULTURAL OCCUPATIONS WERE CONCENTRATED MOST HEAVILY IN SERVICE AND RETAIL SALES, (2) AN ESTIMATED 28,685 FULL-TIME AND 16,841 PART-TIME WORKERS WERE EMPLOYED IN OFF-FARM AGRICULTURAL OCCUPATIONS IN THE 260 SCHOOL DISTRICTS, (3) EMPLOYERS' ESTIMATES INDICATED A GROWTH RATE OF 19 PERCENT FOR FULL-TIME WORKERS AND 13 PERCENT FOR PART-TIME WORKERS BETWEEN 1964 AND 1969, AND (4) A HIGH SCHOOL EDUCATION WAS SUFFICIENT FOR FULL-TIME WORKERS IN THE VAST MAJORITY OF OCCUPATIONS. RECOMMENDATIONS FOR FURTHER RESEARCH ARE INCLUDED. (PS)

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A STUDY OF

OFF-FARM AGRICULTURAL OCCUPATIONS IN NEW YORK STATE

by

HAROLD R. CUSHMAN
VIRGIL E. CHRISTENSEN
GARRY R. BICE

A Cooperative Research Project of

The Agricultural Education Division
Rural Education Department
New York State College of Agriculture
Cornell University
Ithaca, New York

Bureau of Agricultural Education
The State Education Department
Albany 1, New York

Contributing Boards of Education
and
Boards of Cooperative Educational Services
in New York State

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Harold R. Cushman
Virgil E. Christensen
Garry R. Bice

January 1965

Agricultural Education Division
Rural Education Department
New York State College of Agriculture
Cornell University
Ithaca, New York

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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A STUDY OF OFF-FARM AGRICULTURAL OCCUPATIONS IN NEW YORK STATE

Harold R. Cushman, Virgil E. Christensen and Garry R. Bice

INTRODUCTION

Importance of the Study

The traditional purpose of vocational education in agriculture has been ... "To meet the needs of persons over fourteen years of age who have entered upon or who are preparing to enter upon the work of the farm ... " 1/ In recent years, a number of trends have taken place in agriculture and rural life which have had significant implications for persons charged with responsibility for teaching, administering or preparing teachers for vocational agriculture programs. Some of these trends are:

1. A change from generalized to more highly specialized types of agriculture.
2. A shift of less productive land out of farming and into forestry and outdoor recreation uses.
3. The transfer of many processing, manufacturing and marketing functions, formerly performed by the farmer on the farm, to specialized businesses at off-farm locations.
4. The rapid mechanization of agriculture and the growth of a large sales and service industry in farm machinery and equipment.
5. A profound increase in service occupations meeting the specialized needs of farmers for feed, seed, fertilizer, spray, artificial breeding, record keeping, etc.
6. The growth of residential and suburban areas with an ensuing demand for the products and services of ornamental horticulture, floriculture and landscaping.

As a result of such trends, the 88th Congress specified in the Vocational Education Act of 1963 that ... "any amounts allotted ... for agriculture may be used for vocational education in any occupation involving knowledge and skills in agricultural subjects, whether or not such occupations involve work of the farm ... " 2/ The passage of this act and the

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1/ Administration of Vocational Education, Vocational Education Bulletin No. 1, General Series No. 1, U. S. Department of Health, Education and Welfare, (Washington: Government Printing Office, 1958), p. 27.

2/ Committee on Labor and Public Welfare, United States Senate, Selected Education Acts of 1963, (Washington, D. C.: U. S. Government Printing Office, 1963), pp. 75-76.

appropriation of funds to implement its provisions have created a critical need for detailed information concerning the nature and extent of off-farm agricultural occupations in New York as a basis for:

1. Determining content for training and re-training programs which will prepare youth and adults for employment in such occupations - and upgrade the performance of persons already employed;
2. Formulating and trying out such training programs in various organizational and administrative settings;
3. Determining the sort of physical plant which will be most conducive to efficient learning;
4. Guiding students in exploring career opportunities in such occupations;
5. Guiding students in evaluating their own capabilities against the requirements of off-farm agricultural occupations;
6. Planning programs for the preparation of teachers for the new programs;
7. Allocating funds from the Vocational Education Act of 1963 to support needed training programs, and
8. Developing programs of administration and supervision for the emerging programs.

From the pursuit of such concerns as the above must come many of the guidelines for vocational agriculture in a new era; one in which preparation for the broad spectrum of agricultural occupations will have replaced preparation for farming as the guiding purpose.

Previous Work Contributing to this Study

In a 1961 study of 17 occupations related to farming in the Syracuse economic area, Tom 3/, Hill and Greene found 152 annual entry opportunities. Employers expressed a preference for employees with a high school education, training in vocational agriculture and farm experience.

Early in 1963 a committee of the Joint Staff of Supervisors and Teacher Trainers in Agricultural Education consisting of Dr. Joe P. Bail, Agricultural Education Division, Cornell University and Mr. Everett Lattimer, Bureau of Agricultural Education, State Education Department,

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3/ Frederick K. T. Tom, Charles W. Hill and Kingsley L. Greene, Employment Opportunities in Certain Occupations Related to Farming in the Syracuse, New York Economic Area, (Ithaca: Cornell University, 1961), 27 pp.

assumed leadership for developing a procedure and survey forms for studying the broad complex of off-farm agricultural occupations and cooperating with Dr. Duane Nielsen, Specialist in Teacher Education and Research, Agricultural Education Branch, U. S. Office of Education in his efforts to encourage and coordinate research efforts in this area of concern.

With several states planning extensive studies of employment opportunities and needed competencies in off-farm agricultural occupations during the spring of 1963 it became apparent that several benefits would accrue from a conference jointly sponsored by the National Center for Advanced Study and Research in Agricultural Education and the Agricultural Education Branch of the U. S. Office of Education to further develop and coordinate studies in this vital area. Accordingly plans were developed early in the spring of 1963 for a three-day Research Coordination Conference to be held on the campus of the Ohio State University, May 27, 28 and 29. The broad purposes of this meeting were:

"1. To maximize the possibilities for coordinating and achieving commonality in the agricultural occupations studies being conducted by the several states without violating the integrity of individual state studies;

2. To provide other states with resulting materials and encourage comparable studies;

3. To provide opportunity for individual states to benefit from the experience of others in further developing and refining their proposals." 4/

Participants attended from 14 states. Bail and Lattimer represented New York.

At the 53rd Annual Professional Conference held at Harpur College, June 25-28, 1963, Bail and Lattimer presented a proposed procedure and survey forms for conducting local studies to determine employment opportunities in off-farm agricultural occupations.

Price 5/ in a field test of the proposed procedure in the Wayland Central School district during the fall of 1963 discovered 53 companies employing a total of 248 persons in occupations requiring agricultural competencies. The distribution of these persons by level of employment was 72 semi-skilled, 63 skilled, 51 proprietors and managers, 29 clerical and sales, 17 supervisors and foremen, 10 technical, 4 professional and 2 unclassified. The functions performed by the 248 persons classified as follows: 88 sales, 76 services, 50 processing, 32 manufacturing and two marketing. Several suggestions were made for persons conducting such studies in the future:

4/ Report of Research Coordination Conference on Agricultural Occupations, (Columbus: The Ohio State University, 1963), 92 pp.

5/ John E. Price. (Preliminary data for Master's essay, Cornell University, Ithaca, 1963).

1. Many businesses and services of a non-agricultural nature employ workers needing agricultural competencies. Such businesses and services must be included in the study population for off-farm agricultural occupations studies if the results are to be complete.

2. The yellow pages of the telephone directory, knowledgeable local businessmen and the members of the local agricultural advisory board are reliable sources for identifying the businesses and services in a given area who employ persons needing agricultural competencies.

3. Terms such as agricultural competencies, job titles, level of employment and main function of business are not a part of the businessman's vocabulary. Such terms must be defined and illustrated in a consistent manner during interviews if survey results are to be reliable.

4. The same agricultural competencies are usually useful for entry, needed on the job and a factor in advancement. Efforts to have employers differentiate competencies on such bases proved costly in time and, in general, unrewarding.

5. The original list of agricultural competencies based on an analysis of farming should be expanded by adding competencies drawn from analyses of ornamental horticulture; agricultural machinery sales and service; forestry; conservation and outdoor recreation, and agricultural business.

6. A standardized system is needed for classifying job titles in off-farm agricultural occupations.

7. Special training for interviewers and an interviewers manual will be essential for standardizing interviewing procedures in studies where more than one interviewer is involved.

8. The data from such studies is complex and detailed. Machine processing will be essential to efficient use of time in summarizing results.

9. The public relations implications of such studies should be recognized by teachers interviewing employers within their school district.

The Problem

This study was a cooperative effort to identify and to obtain first-hand information concerning the off-farm agricultural occupations in the school districts offering instruction in agriculture in the State of New York and in two school districts within the Adirondack area. The Agricultural Education Division of the Rural Education Department at Cornell University; the Bureau of Agricultural Education, State Education Department, and Boards of Cooperative Educational Services in representative school districts worked together to this end. The main questions to which answers were sought were:

1. What are the off-farm agricultural occupations?
2. What proportion of time is devoted to use of agricultural competencies in off-farm agricultural occupations?
3. How many persons are employed in such occupations?
4. At what levels of employment are such occupations found?
5. What is the outlook for employment opportunities in these jobs?
6. What agricultural competencies are needed by workers in off-farm agricultural occupations?
7. What are the educational requirements for such occupations?

Assumptions

The following assumptions were made in planning and carrying out this study:

1. That type of farming area, school enrollment and tax base of school district could logically constitute the primary factors to be considered in selecting a representative sample of school districts offering instruction in agriculture.
2. That even a limited sampling of two school districts in the Adirondack area might provide reasonably valid and useful occupational information; particularly as it applied to the forestry and soil conservation and wildlife and recreation occupational families.
3. That identification of school district boundaries, use of the yellow pages classification guide and the yellow pages of area telephone books, personal contacts with local persons judged to be knowledgeable concerning businesses or services in their school district and review by the local Agricultural Advisory Board would result in identification of the "population" of businesses and services having proprietors and/or employees needing agricultural competencies in a local school district.
4. That comparable interview procedures would be followed by teachers of agriculture who had been instructed in the use of the interviewer's manual and interview schedules.
5. That the job titles of all off-farm agricultural occupations would be found in the Dictionary of Occupational Titles 6/; usually under headings other than agriculture.

6/ Dictionary of Occupational Titles, Definition of Titles, Volume I, (Washington: Government Printing Office, 1949).

6. That off-farm agricultural occupations would occur at all levels of employment.

7. That reliable information concerning off-farm agricultural occupations could be obtained from employers.

Scope and Limitations of the Study

The recognized study limitations were:

1. A "population" consisting of those school districts in New York offering instruction in agriculture during the school year 1963-64;

2. A stratified-random sample of the population composed of 16 of the 260 school districts in the population;

3. A sampling of but two selected school districts out of several located in the Adirondack area;

4. All information was obtained from employers; no employees were interviewed.

Operational Definitions

The following definitions were employed in this study:

1. An agricultural occupation is one in which the workers need competencies in one or more of the primary areas of plant science, animal science, agricultural business and agricultural mechanization.

2. Competency - ability.

3. Main function of business or service - the specific operation performed and the main contribution made to society by the business or service.

   (a) Retail Sales - The selling of goods or property for money, usually directly to the consumer or his agent.
   (b) Service - The installation, maintenance or repair of an article, applicance, machine, convenience, or other property or things; also the performance of specialized tasks essential to production.
   (c) Manufacturing or Processing - The production of goods by hand, by special methods or by industrial art or processes; to work into useful form.
   (d) Education - The teaching, instruction or training of an individual in either formal or informal settings.
   (e) Wholesaling - The purchase and/or sale of goods in large bulk or quantity, often to a buyer who plans to resell at retail.
   (f) Specialized Agricultural Production - The growing of plants and animals at off-farm locations.
   (g) Recreation - Refreshment of body and mind, but generally both; diversion; amusement; any pleasurable exercise.

4. Levels of employment 7/.

(a) Professional -

(1) Professional jobs usually require a high degree of mental activity by the worker and are concerned with theoretical or practical aspects of complex fields of human endeavor. A minimum of a college degree or experience of such character and scope to provide equivalent background is required.

(2) Examples: 4-H Club Agent, veterinarian, forester.

(b) Managerial -

(1) Managerial jobs are involved with responsibility for policy-making, planning, supervising, coordinating, or guiding the work activity of others, usually through intermediate supervisors.

(2) Examples: Manager of agricultural sales and service business, manager of milk processing plant, greenhouse manager.

[NOTE: Foremen that have limited responsibility for policy-making and management are not included. They are classified with the skilled occupations.]

(c) Technical -

(1) This group of occupations requires somewhat similar education and/or experience to the professional occupations. These fields of work, however, are less demanding with respect to background or the need for initiative or judgement than those fields which are considered as "professional."

(2) Examples: Artificial inseminator, dairy herd improvement supervisor, laboratory technician.

(d) Clerical -

(1) This group of occupations includes jobs dealing with the preparation, transcribing, transferring, systematizing, or preserving of written communications and records in offices, shops, etc.

(2) Examples: Bookkeeper, camp clerk, rural bank teller.

(e) Sales -

(1) Included in this group are occupations concerned with the sale of commodities, investments, real estate and occupations closely related to sales work.

(2) Examples: Salesman, rural insurance representative, auctioneer.

(f) Service -

(1) Included in this group are occupations concerned with the welfare and personal needs of people on a non-professional basis.

(2) Examples: Guide, dude ranch riding instructor.

7/ Ibid., adapted from Volume II, Occupational Outlook Handbook.

(g) Skilled -

(1) This group includes craft and manual jobs and the workers must have a thorough knowledge of the processes involved in their work. They exercise considerable independent judgement and often need a high degree of manual dexterity. In some instances they are responsible for valuable equipment or products. Workers in skilled occupations usually become qualified by serving apprenticeships or completing extensive training programs.

(2) Examples: Poultry sexer, cheese maker, lumber grader.

(h) Semi-skilled -

(1) This group of manual jobs is characterized by one, or a combination of the following requirements: The worker must exercise manipulative ability of a high order, but it is limited to a fairly well-defined work routine. Major reliance is not so much upon the worker's judgement and dexterity but upon vigilance and alertness. Any exercise of independent judgement to meet variables in the work situation is not based on a wide knowledge of the job field and the nature and extent of the judgements are limited either by application over a relatively narrow task situation or by having important decisions made by others.

(2) New employees in semi-skilled jobs are required only to be physically able to perform the work. At the beginning they are not expected to be highly proficient but after a short training period they must work at a standard, fast and steady pace.

(3) Truck drivers are the largest single group of semi-skilled workers. Many semi-skilled employees work as helpers or assistants to skilled workers. They often repeat the same motions or the same jobs throughout the day. In general, semi-skilled workers work with their hands.

(4) Other examples: Log scaler, meat cutter, heavy equipment operator.

(i) Unskilled -

(1) This group includes manual occupations that involve the performance of simple duties that may be learned within a short time period and that require little or no independent judgement.

(2) Frequently, these jobs involve handling or moving objects or materials, e. g., loading or unloading, digging, shoveling, hauling, hoisting, wrapping and mixing. Some of these unskilled jobs require heavy physical work.

(3) Examples: Golf course laborer, nursery laborer, custodian, pulp cutter.

5. No operational definition of a full-time or part-time employee was established. This differentiation was left to the judgement of the persons interviewed.

Procedures Used

1. Selection of the study population.

The 260 school districts in New York State offering instruction in agriculture during the school year 1963-64 were selected as the study population. It was assumed that school districts representative of this group would be willing to cooperate in the study by making available the services of their teachers of agriculture to collect local data. The main disadvantage of this choice of population was that it would not allow generalization of the results to the state as a whole. The geographical distribution of the school districts included in the population is shown in Figure 1.

2. Sampling procedures.

A stratified-random sample of school districts offering instruction in agriculture was selected using the following procedures:

(a) Each of the 260 school districts was assigned a number.
(b) The 260 school districts were then sorted according to the types of farming area [8] in which they were located; dairy, general farming, poultry, vegetables and fruit.
(c) The median for "K-12 school population" and the median for "full value of taxable real property per resident child in weighted average daily attendance" were obtained from the State Education Department for the school districts offering agricultural instruction in each type of farming area.
(d) The school districts in each type of farming area were placed in one of four categories:

  (1) Above median in "K-12 school population" and above median in "full value . . . "
  (2) Above median in "K-12 school population" and below median in "full value . . . "
  (3) Below median in "K-12 school population" and above median in "full value . . . "
  (4) Below median in "K-12 school population" and below median in "full value . . . "

(e) Using a random numbers table, one school district was selected at random from those within each of the four categories (in [d] above) for each of the types of farming. A first alternative and a second alternative were also drawn.

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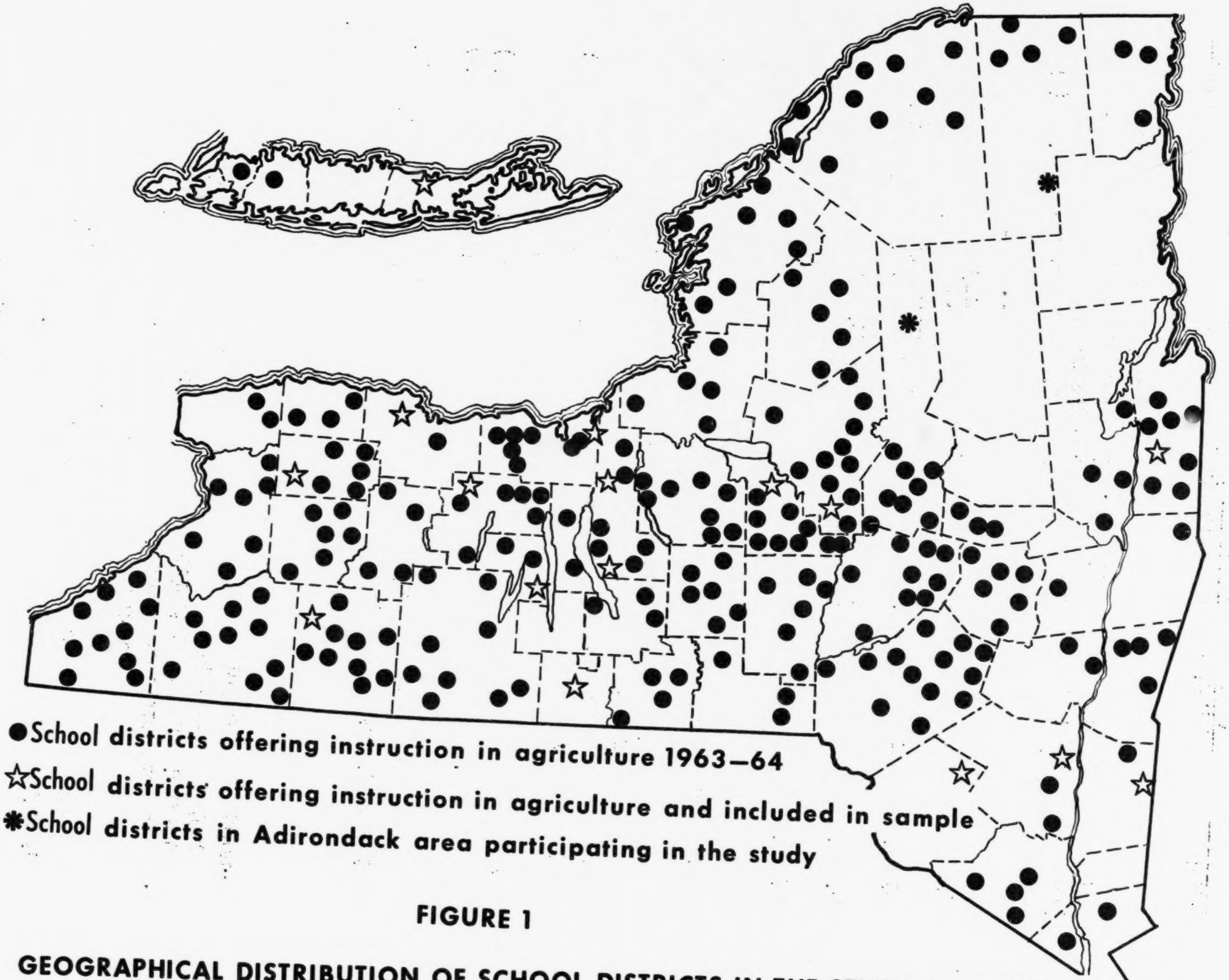
[8] Feuer, Lowe, Hartwig and Peech, New York Agriculture At A Glance, (Ithaca: New York State College of Agriculture, 1963), 16 pp.



●School districts offering instruction in agriculture 1963–64

☆School districts offering instruction in agriculture and included in sample

✱School districts in Adirondack area participating in the study

FIGURE 1

GEOGRAPHICAL DISTRIBUTION OF SCHOOL DISTRICTS IN THE STUDY POPULATION

(f) The school administrators of the selected school districts (or in some cases the administrator of the Board of Cooperative Educational Services) were contacted by the Bureau of Agricultural Education to obtain permission for the teacher of agriculture to devote 20 working days to participation in the study. The administrators of alternate schools were contacted where circumstances made this procedure necessary. Following this procedure, cooperation was obtained from 16 school districts.

(g) A sample of two districts was selected in the Adirondack area on the basis that the districts were somewhat representative of the major conservation activities including forest management, wildlife management and outdoor recreation. A member of the faculty of each of the two school districts was employed to conduct interviews.

3. Development of interview schedules and interviewers manual.

The proposed procedure and survey forms developed by Bail and Lattimer were revised using: Price's 9/experience with these materials in his census of the Wayland Central School District; lists of agricultural competencies developed by committees of the "Joint Staff of Supervisors and Teacher Trainers in Agricultural Education" from analyses of ornamental horticulture, agricultural machinery sales and service, forestry, conservation, outdoor recreation and agricultural business; recommendations previously made by various committees at the Research Coordination Conference held on the campus of Ohio State University, May 27, 28, and 29, 1963, and the coding recommendations of the Cornell Computing Center.

Following critical review of the tentative interview schedules and interviewer's manual by several members of the Division of Agricultural Education at Cornell University and the Bureau of Agricultural Education, State Education Department, an extensive field test was conducted at Red Creek Central School District. Experience gained in the try-out under field conditions, additional critical review by professional colleagues and experience gained in coding the results of the field test at Red Creek were all employed in the final revision of the interview schedules, Appendix A, and the interviewer's manual. 10/

4. Training of interviewers.

A four-hour orientation meeting was held by the project staff with participating teachers on Tuesday, June 30, 1964, during the Annual Professional Conference at Farmingdale Agricultural and Technical Institute. The following agenda was followed:

9/ Price, op. cit.

10/ Interviewers Reference Manual - A Study of Off-Farm Agricultural Occupations in New York State, Mimeograph, (Ithaca: Cornell University, 1964), 23 pp.

(a) Plans for the Study (60 minutes)
(b) Instructions for Using the Yellow Pages Classification Guide (30 minutes)
(c) Instructions for Completing the Interview Schedules (60 minutes)
(d) Guides for Interviewing (30 minutes)
(e) Practice in Completing the Interview Schedules (60 minutes)

Each teacher was instructed to:

(a) Plot the boundaries of the school district on a large scale map.
(b) Compile a list of businesses and services within the school district that might have employees needing agricultural competencies using: the "yellow pages classification guide" and the yellow pages of the telephone books for the area, personal contacts with a minimum of three knowledgeable persons and the assistance of the agricultural advisory board.
(c) Arrange and conduct interviews with the owner-operator, manager, personnel director or other representatives of each business or service on the list compiled. Interviewers not in attendance at the Farmingdale meeting were instructed individually by the Coordinator of Field Interviewers.

5. Collection of data.

A majority of the interviews were completed during July and August; the remainder were carried out in September and October, 1964. The Coordinator of Field Interviewers visited each interviewer during July and made additional visits to lend assistance as requested in August.

A noteworthy aspect of this study was that the decision as to whether or not a given business or service had employees needing agricultural competencies was left, by the interviewers, to the judgement of the employer.

6. Number and function of businesses studied.

A total of 541 businesses or services were studied in the sample drawn from the 260 school districts, offering instruction in agriculture during the school year 1963-64. TABLE I. Of these 155 (29 per cent) were located in dairy farming areas, 77 (14 per cent) were located in fruit farming areas, 176 (33 per cent) were in poultry farming areas, 61 (11 per cent) were in vegetable farming areas and the remaining 72 (13 per cent) were in general farming areas.

The distribution of the 541 businesses or services by main functions was as follows: service 40 per cent, retail sales 35 per cent, manufacturing eight per cent, wholesaling six per cent, specialized agricultural production (other than farming) four per cent, recreation four per cent and education three per cent.

TABLE I

NUMBER AND MAIN FUNCTION OF BUSINESSES OR SERVICES STUDIED

Type of farming area	Number of school districts	Number of businesses or services by function							
		Retail sales	Service	Manufacturing & processing	Education	Wholesaling	Specialized agricultural production *	Recreation	Totals
Dairy	4	55	67	11	8	4	7	3	155
Fruit	3	32	33	6	-	3	-	3	77
Poultry	3	60	67	15	7	9	9	9	176
Vegetable	3	16	22	6	2	9	4	2	61
General	3	25	29	6	2	6	1	3	72
Sub-total	16	188	218	44	19	31	21	20	541
Per cent of 541	-	35	40	8	3	6	4	4	100
Adirondack areas	2	10	21	-	5	-	3	14	53
Per cent of 53	-	19	40	-	9	-	6	26	100

* Other than farming

An additional 53 businesses or services were studied in two school districts in the Adirondacks.

7. Treatment of data.

The facilities and equipment of the Cornell Computing Center were used throughout the several stages of data processing. As completed interview schedules were received from the field, the data were coded and punched on I. B. M. cards following the format shown in APPENDIX B. The 083 Sorter, 101 Electronic Statistical Computer and the 407 Tabulator were utilized at appropriate stages in processing the data.

The steps employed in compiling several of the tables are described in APPENDIX C.

FINDINGS

A. OFF-FARM AGRICULTURAL OCCUPATIONS IN THE 260 SCHOOL DISTRICTS OFFERING INSTRUCTION IN AGRICULTURE DURING 1963-64

Job Titles of Off-Farm Agricultural Occupations and Proportion of Time Typical Workers Spend on Use of Agricultural Competencies

A total of 213 differenct job titles of off-farm agricultural occupations were found in the 16 school districts surveyed. All except eight of the job titles were subsequently located in the Dictionary of Occupational Titles. 11/ The 213 job titles are listed below by occupational family; in the order by which they were coded for data processing. In each case the job title is preceded by the appropriate D. O. T. Code Number (if located) and followed by the proportion of time which employers reported that a typical worker in this job title spent on tasks requiring agricultural competencies.

D. O. T. Number	Job Titles by Occupational Families	Per Cent of Time Workers Use Agricultural Competencies
	AGRICULTURAL MACHINERY SALES AND SERVICE	
0 - 72.71	Manager	98
0 - 72.71	Assistant Manager	97
1 - 86.16	Salesman	67
0 - 91.80	Fieldman	100
1 - 01.02	Bookkeeper	76
1 - 70.10	Sales Clerk	100
7 - 36.250	Truck Driver	94
0 - 87.10	Custodian	70
0 - 97.67	Parts Manager	91
0 - 97.67	Parts Helper	95
5 - 92.711	Foreman	74
3 - 35.10	Mechanic	80
3 - 35.10	Mechanic's Helper	96
0 - 97.45	Branch Manager	100
5 - 83.641	Serviceman	100
4 - 85.040	Combination Welder	60
4 - 75.010	Machinist	36
5 - 92.711	Shop Foreman	100

11/ Dictionary of Occupational Titles, Definition of Titles, loc. cit.

D. O. T. Number	Job Titles by Occupational Families	Per Cent of Time Workers Use Agricultural Competencies
	AGRICULTURAL SUPPLIES AND EQUIPMENT	
0 - 72.71	Manager	86
0 - 72.71	Assistant Manager	74
1 - 86.16	Salesman	62
0 - 91.80	Fieldman	90
1 - 01.02	Bookkeeper	78
1 - 70.10	Sales Clerk	49
7 - 36.250	Truck Driver	52
5 - 83.641	Serviceman	80
4 - 07.100	Miller	64
6 - 07.400	Roll Tender (grinder man)	33
9 - 59.02	Yardman (building materials)	68
5 - 25.110	Carpenter	96
9 - 88.40	Stockboy (general helper)	15
0 - 97.61	Sales Manager	100
5 - 91.031	Foreman	85
5 - 83.621	Maintenance Man	97
0 - 97.51	Manager, Production	60
5 - 23.910	Operating Engineer	76
9 - 32.01	Laborer	100
5 - 25.150	Finish Carpenter	100
5 - 91.031	Warehouse Foreman (grain and feed mill)	68
9 - 88.40	Warehouse Man	54
0 - 74.13	Department Manager (buyer assistant)	60
3 - 35.10	Mechanic	100
6 - 78.145	Screw Machine Operator	75
4 - 33.914	Millman Woodwork	84
4 - 97.010	Electrician	100
4 - 85.040	Combination Welder	100
5 - 23.910	Heavy Equipment Operator	100
5 - 24.010	Bricklayer	20
5 - 30.210	Plumber	97
0 - 97.67	Parts Manager	90
	DAIRY MANUFACTURING AND PROCESSING	
0 - 72.71	Manager	89
0 - 72.71	Assistant Manager	68
1 - 86.16	Salesman	100
1 - 48.24	Fieldman	95
1 - 01.02	Bookkeeper	100
7 - 36.250	Truck Driver	62
0 - 87.10	Custodian	50

D. O. T. Number	Job Titles by Occupational Families	Per Cent of Time Workers Use Agricultural Competencies
0 - 50.46	Laboratory Technician	95
4 - 06.010	Ice Cream Maker	80
4 - 06.410	Cheese Maker	100
4 - 06.570	Pasteurizer	50
8 - 06.51	Milk Plant Laborer	74
5 - 91.001	Foreman	100
0 - 01.20	Accountant (general)	100
5 - 83.611	Maintenance Man	95
6 - 06.560	Milk Inspector	100
6 - 06.510	Condenserman	70
3 - 35.10	Mechanic	80
	LIVESTOCK MARKETING AND PROCESSING	
0 - 72.71	Manager	92
1 - 86.16	Salesman	84
1 - 01.02	Bookkeeper	73
1 - 70.10	Sales Clerk	50
7 - 36.250	Truck Driver	20
0 - 91.80	Buyer	40
0 - 91.80	Dealer	25
1 - 51.10	Auctioneer	93
4 - 09.205	Butcher	80
5 - 58.100	Meat Cutter	83
9 - 88.40	Warehouseman	75
0 - 97.01	President	66
9 - 88.40	Stock Tender	50
	OTHER LIVESTOCK INDUSTRY	
0 - 72.71	Manager	100
1 - 01.02	Bookkeeper	60
0 - 34.10	Veterinarian	77
0 - 34.10	Veterinarian's Assistant	100
0 - 50.46	Laboratory Technician	100
5 - 86.515	Laboratory Chief	100
3 - 07.70	Beekeeper	100
5 - 91.001	Foreman	90
9 - 88.40	Stock Tender	100
	POULTRY INDUSTRY	
0 - 72.71	Manager	100
7 - 36.250	Truck Driver	40
3 - 08.10	Debeaker	100
3 - 48.03	Sexer	60
3 - 41.10	Incubator Specialist	80

D. O. T. Number	Job Titles by Occupational Families	Per Cent of Time Workers Use Agricultural Competencies
	CROPS MARKETING AND PROCESSING	
0 - 72.71	Manager	78
0 - 72.71	Assistant Manager	100
1 - 86.16	Salesman	100
1 - 48.27	Fieldman	93
1 - 01.02	Bookkeeper	87
7 - 36.250	Truck Driver	83
8 - 04.10	Packer	83
3 - 16.20	Harvest Hand	100
6 - 04.570	Grader	40
0 - 97.51	Superintendent (factory)	80
5 - 91.021	Warehouse Foreman	90
3 - 35.10	Mechanic	85
9 - 88.01	Truck Loader	50
5 - 91.021	Foreman	95
3 - 37.20	Group Leader (crew boss)	100
	FORESTRY AND SOIL CONSERVATION	
0 - 68.26	Fire Warden	100
5 - 91.401	Lumberman	88
0 - 35.03	Soil Conservation Technician	90
0 - 35.01	Agronomist	90
5 - 91.401	Hook Tender (logger)	50
5 - 97.901	Foreman	100
	WILDLIFE AND RECREATION	
3 - 96.10	Guide	100
0 - 35.12	Wildlife Specialist	100
0 - 94.94	Fish and Game Warden	65
(Not found in D. O. T.)	Park Attendant	70
7 - 61.110	Park Caretaker	75
0 - 27.08	Youth Camp Director	100
(Not found in D. O. T.)	Camp Operator	90
9 - 61.11	Camp Grounds Caretaker	100
3 - 40.03	Golf Course Greens Keeper	85
3 - 40.07	Golf Course Laborer	42
(Not found in D. O. T.)	Live Bait Dealer	50
(Not found in D. O. T.)	Boat Sales Business Manager	75
1 - 86.43	Boat Salesman	94
0 - 88.24	Marine Engine Mechanic	70
(Not found in D. O. T.)	Dude Ranch Manager	80
0 - 57.45	Dude Ranch Riding Instructor	100
0 - 98.54	Manager	80

D. O. T. Number	Job Titles by Occupational Families	Per Cent of Time Workers Use Agricultural Competencies
5 - 83.621	Maintenance Man	100
0 - 27.08	Camp Director	63
0 - 27.40	Camp Counselor	100
2 - 61.11	Lifeguard	100
5 - 23.910	Heavy Equipment Operator	60
5 - 99.030	Foreman (government service)	85
2 - 05.01	Camp Cook	50
9 - 61.11	Park Laborer	50
3 - 40.04	Groundskeeper	85
	ORNAMENTAL HORTICULTURE	
3 - 38.20	Manager	88
3 - 38.20	Assistant Manager	100
1 - 86.16	Salesman	75
1 - 01.02	Bookkeeper	75
1 - 36.250	Sales Clerk	90
3 - 39.10	Truck Driver	70
3 - 38.20	Nurseryman	70
3 - 38.10	Flower Raiser	97
3 - 39.30	Nursery Laborer	100
3 - 40.04	Gardener	80
3 - 40.04	Lawn Keeper	80
3 - 40.12	Tree Sprayer	50
3 - 40.13	Pruner	20
0 - 35.05	Arborist	50
3 - 40.06	Landscape Gardener	75
0 - 03.20	Landscape Architect	65
5 - 97.901	Landscape Foreman	95
9 - 61.11	Park Laborer	100
3 - 38.20	Greenhouse Florist	50
3 - 39.10	Greehouse Laborer	42
	FARM SERVICE	
3 - 48.94	Artifician Inseminator	82
(Not found in D. O. T.)	Crop Sprayer	100
0 - 50.45	Dairy Herd Improvement Supervisor	98
0 - 72.71	Manager	95
4 - 85.040	Combination Welder	82
7 - 36.250	Truck Driver	75
1 - 01.02	Bookkeeper	60

D. O. T. Number	Job Titles by Occupational Families	Per Cent of Time Workers Use Agricultural Competencies
	AGRICULTURAL SERVICE	
0 - 12.20	County Agricultural Agent	100
0 - 12.20	County 4-H Club Agent	100
0 - 31.01	Teacher of Agriculture	82
0 - 06.71	Agricultural Journalist	93
(Not found in D. O. T.)	Agricultural Representative for Power Company	90
1 - 57.10	Rural Insurance Representative	51
1 - 48.52	Rural Real Estate Representative	64
1 - 48.52	Appraiser	73
(Not found in D. O. T.)	General Repairman	80
5 - 81.510	Auto Body Man	91
3 - 35.10	Mechanic	57
0 - 44.26	Advertising Layout Man	100
1 - 05.01	General Office Clerk	100
1 - 48.25	Credit Checker	52
0 - 87.10	Custodian	97
5 - 23.910	Heavy Equipment Operator	82
8 - 94.34	Laborer	64
5 - 30.210	Plumber	97
0 - 72.71	Manager	76
0 - 97.02	Vice-President	97
0 - 97.12	Office Manager	53
0 - 85.10	Credit Manager	83
0 - 01.20	General Accountant	15
5 - 83.611	Maintenance Man	73
5 - 99.030	Foreman	59
7 - 96.100	Plumber Apprentice	100
5 - 27.010	Painter	92
5 - 25.110	Carpenter	89
1 - 51.10	Auctioneer	84
7 - 36.250	Truck Driver	80
1 - 01.02	Bookkeeper	100
0 - 12.30	Home Demonstration Agent	100
5 - 99.050	Utilities and Maintenace Foreman	100
1 - 01.52	Cashier (bank)	92
4 - 97.010	Electrician	100
3 - 07.10	Horse Breeder	100
0 - 95.18	Inspector (government service)	58
6 - 06.560	Milk Inspector	80
5 - 75.232	Water Well Driller	67
0 - 97.51	Plant Superintendent	100
1 - 70.10	Sales Clerk	25
1 - 37.12	Stenographer	50
9 - 32.61	Whitewasher	75
0 - 64.10	Surveyor	80

Proportion of Time Devoted to Use of Agricultural Competencies in Twelve Families of Off-Farm Agricultural Occupations

Based on employers' estimates, workers in the 213 off-farm agricultural occupations spent an average of 83 per cent of their work time on tasks requiring agricultural competencies. TABLE II. However, the proportion of time thus spent varied from 15 per cent for some job titles to 100 per cent for others.

Projected Number of Persons Employed During 1964 in Off-Farm Agricultural Occupations in 260 New York School Districts Offering Instruction in Agriculture in 1963-64

It was estimated the 28,685 persons were employed full-time in off-farm agricultural occupations in the 260 New York school districts offering instruction in agriculture during 1963-64. TABLE III. Of this number 8,967 (31 per cent) were employed in 32 job titles in Agricultural Supplies and Equipment, 7,876 (27 per cent) were in 44 job titles in Agricultural Service and 4,879 (17 per cent) were in 18 job titles in Agricultural Machinery Sales and Service.

It was further estimated that an additional 16,841 persons were employed part-time. Of this number 10,769 (64 per cent) were found in 15 job titles in Crops Marketing and Processing, 2,725 (16 per cent) were in 44 job titles in Agricultural Services and 1,085 (six per cent) were employed in 26 job titles in Wildlife and Recreation.

On a per school district basis, it was estimated that there were 110 full-time and 65 part-time workers in off-farm agricultural occupations in a typical New York school district offering agricultural instruction in 1963-64.

Classification of Workers in Off-Farm Agricultural Occupations by Levels of Employment

Employers classified their full-time workers in off-farm agricultural occupations by level of employment as follows: semi-skilled 28 per cent, skilled 27 per cent, managerial 15 per cent, sales 13 per cent, clerical four per cent, professional four per cent, unskilled four per cent, technical four per cent, and service one per cent. TABLE IV.

Part-time workers were classified by employers as follows: semi-skilled 76 per cent, sales nine per cent, skilled four per cent, unskilled four per cent, clerical two per cent, managerial two per cent, professional one per cent, technical one per cent and service one per cent. TABLE V. Of the 1161 part-time workers classified as semi-skilled, 1025 (88 per cent) were employed in Crops Marketing and Processing. It was also noted that 119 (88 per cent) of the 136 part-time workers classified in sales were employed in Agricultural Service.

TABLE II

PROPORTION OF TIME DEVOTED TO USE OF AGRICULTURAL COMPETENCIES BY FULL-TIME WORKERS IN TWELVE FAMILIES OF OFF-FARM AGRICULTURAL OCCUPATIONS

Occupational Families	Number of different job titles	Range 1/ (in per cent)	Mean 2/ (in per cent)
1. Agricultural Machinery Sales and Service	18	36-100	82
2. Agricultural Supplies and Equipment	32	15-100	83
3. Dairy Manufacturing and Processing	18	50-100	78
4. Livestock Marketing and Processing	13	20-100	81
5. Other Livestock Industry	9	60-100	77
6. Poultry Industry	5	40-100	93
7. Crops Marketing and Processing	15	40-100	82
8. Forestry and Soil Conservation	6	50-100	88
9. Wildlife and Recreation	26	42-100	96
10. Ornamental Horticulture	20	20-100	80
11. Farm Service	7	60-100	86
12. Agricultural Service	44	15-100	83
TOTAL	213	-	-
Mean for all workers	-	-	83

1/ Between job titles in each occupational family.
2/ Weighted by number of workers in each job title.

TABLE III

PROJECTED NUMBER OF PERSONS EMPLOYED DURING 1964 IN OFF-FARM AGRICULTURAL OCCUPATIONS IN NEW YORK SCHOOL DISTRICTS OFFERING INSTRUCTION IN AGRICULTURE, 1963-64

Occupational Families	Number of different job titles represented	Persons employed during 1964						
		Full-time			Part-time			
		Actual 16 districts	Projected 260 districts		Actual 16 districts	Projected 260 districts		
			Number	Per cent		Number	Per cent	
1. Agricultural Machinery Sales and Service	18	316	4,879	17	30	425	3	
2. Agricultural Supplies and Equipment	32	764	8,967	31	45	594	4	
3. Dairy Manufacturing and Processing	18	178	1,581	6	2	19	-	
4. Livestock Marketing and Processing	13	96	1,282	5	14	345	2	
5. Other Livestock Industry	9	28	852	3	2	48	-	
6. Poultry Industry	5	3	10	-	5	17	-	
7. Crops Marketing and Processing	15	176	990	3	1,052	10,769	64	
8. Forestry and Soil Conservation	6	11	179	1	18	101	1	
9. Wildlife and Recreation	26	62	517	2	83	1,085	6	
10. Ornamental Horticulture	20	131	871	3	82	700	4	
11. Farm Service	7	31	681	2	2	13	-	
12. Agricultural Service	44	514	7,876	27	196	2,725	16	
Totals	213	2,310	28,685	100	1,531	16,841	100	
Per school district	-	-	110	-	-	65	-	

TABLE IV

CLASSIFICATION OF FULL-TIME WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS BY LEVELS OF EMPLOYMENT

Occupational families	Number of workers classified									Totals
	Professional	Managerial	Technical	Clerical	Sales	Service	Skilled	Semi-skilled	Unskilled	
1. Agricultural Machinery Sales and Service	-	74	-	22	45	2	156	11	6	316
2. Agricultural Supplies and Equipment	-	113	14	26	79	14	169	321	28	764
3. Dairy Manufacturing and Processing	-	24	14	5	5	-	82	48	-	178
4. Livestock Marketing and Processing	-	12	-	2	17	-	33	32	-	96
5. Other Livestock Industry	12	3	1	-	-	-	5	7	-	28
6. Poultry Industry	-	3	-	-	-	-	-	-	-	3
7. Crops Marketing and Processing	1	22	18	6	-	-	-	105	24	176
8. Forestry and Soil Conservation	3	5	-	-	-	-	3	-	-	11
9. Wildlife and Recreation	13	16	-	-	-	-	7	22	4	62
10. Ornamental Horticulture	-	33	10	2	-	-	10	76	-	131
11. Farm Service	-	2	11	1	-	-	16	1	-	31
12. Agricultural Service	60	50	14	33	163	-	139	34	21	514
Totals	89	357	82	97	309	16	620	657	83	2, 310
Per cent	4	15	4	4	13	1	27	28	4	100

TABLE V

CLASSIFICATION OF PART-TIME WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS BY LEVELS OF EMPLOYMENT

Occupational families	Number of workers classified									Totals
	Professional	Managerial	Technical	Clerical	Sales	Service	Skilled	Semi-skilled	Unskilled	
1. Agricultural Machinery Sales and Service	-	1	-	3	3	1	6	-	6	30
2. Agricultural Supplies and Equipment	-	3	-	5	7	-	15	13	2	45
3. Dairy Manufacturing and Processing	-	-	-	-	1	-	1	-	-	2
4. Livestock Marketing and Processing	-	1	-	5	2	-	1	5	-	14
5. Other Livestock Industry	-	1	-	1	-	-	-	-	-	2
6. Poultry Industry	-	-	-	-	-	-	-	5	-	5
7. Crops Marketing and Processing	-	7	4	6	-	-	9	1025	1	1,052
8. Forestry and Soil Conservation	-	3	-	-	-	15	-	-	-	18
9. Wildlife and Recreation	-	8	11	-	4	3	14	18	25	83
10. Ornamental Horticulture	-	6	-	-	-	-	5	59	12	82
11. Farm Service	-	-	-	-	-	1	-	1	-	2
12. Agricultural Service	5	1	3	9	119	-	6	35	18	196
Totals	5	31	18	29	136	20	67	1161	64	1,531
Per cent	1	2	1	2	9	1	4	76	4	100

Projected Number of Persons Employers Predict Will Be Employed in 1969 in Off-Farm Agricultural Occupations in 260 New York School Districts Offering Instruction in Agriculture During 1963-64

Based on employers' predictions it was estimated that 34,152 full-time workers will be employed in off-farm agricultural occupations by 1969; compared to 28,685 in 1964. TABLE VI. Of the 34,152 full-time workers it was estimated that 10,289 (30 per cent) would be employed in 32 job titles in Agricultural Supplies and Equipment, 9,630 (28 per cent) would be in 44 job titles in Agricultural Service and 6,181 (18 per cent) would be in 18 Agricultural Machinery Sales and Service job titles.

It was further estimated that an additional 18,950 persons would be employed part-time. Of this number 12,784 (67 per cent), it was estimated, would be in 15 job titles in Crops Marketing and Processing, 2,759 (15 per cent) would be in 44 job titles in Agricultural Service and 1,083 (six per cent) would be in 26 job titles in Wildlife and Recreation.

On a per school district basis it was estimated that by 1969 there would be 131 full-time and 73 part-time workers in off-farm agricultural occupations in a typical New York school district which offered instruction in agriculture during 1963-64.

The estimated increase of 5,467 in full-time workers represented a 19 per cent growth rate over the five-year period. The study further showed that the most rapid rate of growth for full-time workers would take place in Crops Marketing and Processing, 32 per cent; Wildlife and Recreation, 28 per cent, and Agricultural Machinery Sales and Service, 27 per cent.

The estimated increase of 2,109 in part-time workers represented a 13 per cent growth rate over the five-year period. The rapid growth rates predicted in Crops Marketing and Processing, 19 per cent, and Agricultural Machinery Sales and Service, 17 per cent were also noteworthy.

Employment Opportunities Outlook in Off-Farm Agricultural Occupations in the 260 New York School Districts Offering Instruction in Agriculture During the School Year 1963-64

It was estimated that during the five-year period 1964-69, a total of 24,033 employment opportunities would be available in the off-farm agricultural occupations in the 260 school districts included in the study. TABLE VII. Of this number 14,085 would be in full-time jobs and 9,948 would be in part-time employment. An individual school district might therefore anticipate 92 employment opportunities over the five-year period; 54 full-time and 38 part-time. On a per school district, per year basis the study showed an average of 19 employment opportunities; 11 in full-time and eight in part-time jobs. It should be emphasized that these estimateds did not include those who would enter farming or those who would find employment in off-farm agricultural occupations in urban or other areas outside of the 260 school districts.

TABLE VI

PROJECTED NUMBER OF PERSONS EMPLOYERS PREDICT WILL BE EMPLOYED IN 1969 IN OFF-FARM AGRICULTURAL OCCUPATIONS IN NEW YORK SCHOOL DISTRICTS OFFERING INSTRUCTION IN AGRICULTURE DURING 1963-64

Occupational families	Number of different job titles represented	Predicted employment 1969							
		Full-time				Part-time			
		Actual 16 districts	Projected 260 districts		Per cent increase over 1964	Actual 16 districts	Projected 260 districts		Per cent increase over 1964
			Number	Per cent			Number	Per cent	
1. Agricultural Machinery and Sales	18	448	6,181	18	27	30	497	3	17
2. Agricultural Supplies and Equipment	32	836	10,289	30	15	46	524	3	-12
3. Dairy Manufacturing and Processing	18	189	1,692	5	7	2	19	-	-
4. Livestock Marketing and Processing	13	110	1,363	4	6	12	380	2	10
5. Other Livestock Industry	9	30	942	3	11	2	48	-	-
6. Poultry Industry	5	3	10	-	-	6	20	-	18
7. Crops Marketing and Processing	15	238	1,305	4	32	1,248	12,784	67	19
8. Forestry and Soil Conservation	6	11	179	1	-	3	52	-	-50
9. Wildlife and Recreation	26	83	660	2	28	96	1,083	6	-
10. Ornamental Horticulture	20	163	1,049	3	20	94	751	4	7
11. Farm Service	7	43	852	2	25	8	33	-	153
12. Agricultural Service	44	652	9,630	28	22	218	2,759	15	1
Totals	213	2,806	34,152	100	-	1,765	18,950	100	-
Per school district	-	-	131	-	19	-	73	-	13

TABLE VII

EMPLOYMENT OPPORTUNITIES OUTLOOK IN OFF-FARM AGRICULTURAL OCCUPATIONS IN 260 NEW YORK SCHOOL DISTRICTS OFFERING AGRICULTURAL INSTRUCTION, 1963-64

Occupational families	Employment opportunities by years									
	1965		1966		1967		1968		1969	
	Full-time	Part-time	Full-time	Part-time	Full-time	Part-time	Full-time	Part-time	Full-time	Part-time
1. Agricultural Machinery Sales and Service	533	65	547	66	560	68	574	69	588	71
2. Agricultural Supplies and Equipment	754	60	768	59	782	57	796	54	810	53
3. Dairy Manufacturing and Processing	151	1	152	1	154	1	156	1	158	1
4. Livestock Marketing and Processing	78	43	79	44	80	45	81	45	82	46
5. Other Livestock Industry	59	3	60	3	61	3	61	3	62	3
6. Poultry Industry	1	3	1	3	1	3	1	3	1	3
7. Crops Marketing and Processing	145	962	150	982	155	1002	160	1022	165	1042
8. Forestry and Soil Conservation	7	11	7	9	7	7	7	4	7	2
9. Wildlife and Recreation	60	246	62	246	64	246	65	245	67	245
10. Ornamental Horticulture	89	158	91	160	93	162	95	164	98	166
11. Farm Service	69	6	70	6	71	6	73	7	75	7
12. Agricultural Service	754	389	771	390	788	391	806	392	823	393
Totals	2700	1947	2758	1969	2816	1991	2875	2009	2936	2032
Per school district	10.4	7.5	10.6	7.6	10.8	7.7	11.1	7.7	11.3	7.8

Employment opportunities were highest for full-time workers in the areas of Agricultural Service, Agricultural Supplies and Equipment and Agricultural Machinery Sales and Service. Opportunities for part-time workers were highest in Crops Marketing and Processing, which accounted for more than one-half of such opportunities, Wildlife and Recreation, Agricultural Service and Ornamental Horticulture.

Agricultural Competencies Needed by Workers in Off-Farm Agricultural Occupations

The agricultural competencies cited by employers as most frequently needed by their workers are listed below for each occupational family. They are listed in rank order beginning with the one needed by the highest proportion of full-time workers in each occupational family. Only the top quartile of the rankings are listed below. Complete lists may be found in APPENDIX D.

AGRICULTURAL MACHINERY SALES AND SERVICE

1. Display, explain and demonstrate items for sale.
2. Order repair parts and new equipment.
3. Understand and use credit.
4. Make job estimates.
5. Sell machinery, equipment, materials, products or supplies.
6. Keep, summarize and analyze records.
7. Arc or oxy-acetylene welding abilities.
8. Operate, maintain and adjust gasoline engines.
9. Operate, maintain and adjust tractors, trucks, agricultural equipment and agricultural machinery.
10. Knowledge of fuels and lubricants.
11. Operate, maintain and adjust diesel engines.

AGRICULTURAL SUPPLIES AND EQUIPMENT

1. Operate, maintain and adjust gasoline engines.
2. Operate, maintain and adjust diesel engines.
3. Install and use materials handling equipment.
4. Understand and use credit.
5. Knowledge of blueprints, space requirements and building materials for agricultural structures.
6. Woodworking and metal working skills.
7. Sell machinery, equipment, materials, products or supplies.
8. Operate, maintain and adjust tractors, trucks, agricultural equipment and agricultural machinery.
9. Investigate and adjust customer complaints.
10. Arc or oxy-acetylene welding abilities.
11. Make job estimates.
12. Display, explain and demonstrate items for sale.
13. Order repair parts and new equipment.
14. Keep, summarize and analyze records.
15. Handle inventories, stock control, warehousing reports, payrolls and accounts.

16. Knowledge of fuels and lubricants.
17. Call on prospective customers.
18. Purchase goods to sell.
19. Plan and arrange for advertising and promotion.
20. Understand agriculture in our economy.

DAIRY MANUFACTURING AND PROCESSING

1. Keep, summarize and analyze records.
2. Sanitation and disease control practices.
3. Produce high quality products.
4. Operate, maintain and adjust tractors, trucks, agricultural equipment and agricultural machinery.
5. Ability to test animal products.
6. Knowledge of grades and standards.
7. Knowledge of blueprints, space requirement and building materials for agricultural structures.
8. Handle inventories, stock control, warehousing reports, payrolls, accounts.
9. Understand agriculture in our economy.
10. Hire, train and supervise workers.
11. Order repair parts and new equipment.
12. Evaluate the total operation and make decisions.

LIVESTOCK MARKETING AND PROCESSING

1. Knowledge of markets and marketing practices.
2. Knowledge of grades and standards.
3. Sanitation and disease control practices.
4. Pasteurize milk.
5. Hire, train and supervise workers.
6. Understand agriculture in our economy.
7. Display, explain and demonstrate items for sale.
8. Investigate and adjust customer complaints.
9. Comply with local, state and federal government trade and licensing regulations.
10. Plan and arrange for advertising and promotion.
11. Call on prospective customers.
12. Make job estimates.
13. Ability to test animal products.

OTHER LIVESTOCK INDUSTRY

1. Sanitation and disease control practices.
2. Ability to test animal products.
3. Produce high quality products.
4. Knowledge of grades and standards.
5. Keep production, breeding and financial records.
6. Knowledge of markets and marketing practices.
7. Housing and handling.
8. Feeding requirements and practices.

9. Use records to improve feeding, breeding and other practices.
10. Knowledge of breeding principles and practices.
11. Evaluate the total operation and make decisions.
12. Hire, train and supervise workers.
13. Purchase goods to sell.
14. Keep, summarize and analyze records.
15. Comply with local, state and federal government trade and licensing regulations.
16. Understand agriculture in our economy.

POULTRY INDUSTRY

(Insufficient number of employers interviewed to be significant.)

CROPS MARKETING AND PROCESSING

1. Process, grade or package.
2. Shipping or storing.
3. Operate, maintain and adjust tractors, trucks, agricultural equipment and agricultural machinery.
4. Comply with local, state and federal government trade and licensing regulations.
5. Understand and use credit.
6. Understand agriculture in our economy.
7. Use legal instruments: wills, deeds, contracts, mortgages, notes.
8. Keep, summarize and analyze records.
9. Select seed, cuttings, bulbs or stock plants.
10. Sell machinery, equipment, materials, products or supplies.
11. Call on prospective customers.
12. Investigage and adjust customer complaints.
13. Evaluate the total operations and make decisions.

FORESTRY AND SOIL CONSERVATION

1. Identify trees of economic importance.
2. Fell, trim, skid and haul logs and pulp.
3. Operate chain saws and other power equipment.
4. Saw, grade, store and haul lumber.
5. Lay out, build and open woods roads.
6. Select, repair and maintain chain saws.
7. Handle inventories, stock control, warehousing reports, payrolls, accounts.
8. Hire, train and supervise workers.
9. Keep, summarize and analyze records.
10. Evaluate the total operation and make decisions.
11. Understand agriculture in our economy.
12. Identify and control common insects and diseases.
13. Arc or oxy-acetylene welding abilities.
14. Operate, maintain and adjust gasoline engines.
15. Operate, maintain and adjust tractors, trucks, agricultural machinery.
16. Farm carpentry.

17. Planning for efficient use of buildings and equipment.
18. Knowledge of paint and painting.

WILDLIFE AND RECREATION

1. Know insurance and safety regulations.
2. Operate turf equipment such as mower, turf, fertilizer spreaders and irrigation equipment.
3. Operate, maintain and adjust gasoline engines.
4. Locate and design drives, walks, fences.
5. Establish lawns.
6. Operate, maintain and adjust tractors, trucks, agricultural equipment and agricultural machinery.
7. Arrange, organize and manage an agricultural shop facility.
8. Manage camp grounds and trailer camps.
9. Knowledge of paint and painting.
10. Correct physical defects of sites being landscaped.
11. Provide for insurance.
12. Control birds and animals injurious to plants.
13. Control insects, diseases and weeds.
14. Prepare seed beds.
15. Plant seeds, bulbs, trees or shrubs.
16. Keep essential records.
17. Know public health laws.
18. Select and buy farm machinery or garden tools, equipment and machinery.
19. Farm carpentry.
20. Concrete, masonry and tile skills.
21. Knowledge of fuels and lubricants.
22. Keep, summarize and analyze records.
23. Use fire fighting tools and equipment.
24. Woodworking or metal working tool skills.
25. Knowledge of characteristics and appropriate use of landscaping materials.
26. Handle inventories, stock control, warehousing reports, payrolls, accounts.
27. Prepare tax returns.
28. Operate chain saws and other power equipment.
29. Know game laws.

ORNAMENTAL HORTICULTURE

1. Prepare seed beds.
2. Plant seeds, bulbs, trees or shrubs.
3. Perform proper tillage practices.
4. Operate, maintain and adjust gasoline engines.
5. Control insects, diseases and weeds.
6. Operate, maintain and adjust garden machines and equipment.
7. Maintain trees and shrubs.
8. Maintain lawns.
9. Manage nursery, planting, transplanting, pruning, shaping and trimming.
10. Correct physical defects of sites being landscaped.

11. Knowledge of paint and painting.
12. Make lime or fertilizer recommendations.
13. Choose proper planting sites.
14. Operate, maintain and adjust tractors, trucks, agricultural equipment and agricultural machinery.
15. Locate and design drives, walks and fences.
16. Provide seasonal protection to ornamental plants.
17. Decide what to grow.
18. Select varieties.
19. Select seed, cuttings, bulbs or stock plants.
20. Mix soil composites.
21. Knowledge of characteristics and appropriate use of landscaping materials.
22. Select, buy, adjust or maintain lawn and garden sprinkler and irrigation equipment.

FARM SERVICE

1. Investigate and adjust customer complaints.
2. Operate, maintain and adjust tractors, trucks, agricultural equipment and agricultural machinery.
3. Keep, summarize and analyze records.
4. Woodworking or metal working tool skills.
5. Arc or oxy-acetylene welding abilities.
6. Operate, maintain and adjust gasoline engines.
7. Call on prospective customers.
8. Understand and use credit.
9. Understand agriculture in our economy.
10. Knowledge of blueprints, space requirements, and building materials for agricultural structures.
11. Operate, maintain and adjust garden machines and equipment.
12. Knowledge of paint and painting.

AGRICULTURAL SERVICE

1. Keep, summarize and analyze records.
2. Evaluate the total operation and make decisions.
3. Understand and use credit.
4. Provide for insurance.
5. Investigate and adjust customer complaints.
6. Comply with local, state and federal government trade and licensing regulations.
7. Call on prospective customers.
8. Display, explain and demonstrate items for sale.
9. Use legal instruments: wills, deeds, contracts, mortgages, notes.
10. Understand agriculture in our economy.
11. Handle inventories, stock control, warehousing reports, payrolls, accounts.
12. Plan and arrange for advertising and promotion.
13. Prepare tax returns.
14. Arc or oxy-acetylene welding abilities.

15. Operate, maintain and adjust tractors, trucks, agricultural equipment and agricultural machinery.
16. Knowledge of fuels and lubricants.
17. Operate, maintain and adjust gasoline engines.
18. Woodworking or metal working tool skills.
19. Make job estimates.
20. Knowledge of paint and painting.
21. Hire, train and supervise workers.
22. Order repair parts and new equipment.
23. Control insects, diseases and weeds.
24. Make lime or fertilizer recommendations.
25. Choose proper planting sites.
26. Know insurance and safety regulations.
27. Recommend soil management practices.
28. Provide seasonal protection to ornamental plants.
29. Prepare seed beds.
30. Perform proper tillage practices.
31. Select varieties.

Areas of Agricultural Competency Most Needed by Workers in Eleven Occupational Families

Five areas of agricultural competency (namely plant science; forestry, soil conservation and outdoor recreation; agricultural business; agricultural mechanics, and animal science) were weighted by annual employment opportunities per school district as follows:

1. A separate count was made of the number of competencies needed in the area of plant science by 20 per cent or more of the workers in each occupational family, i.e. Agricultural Machinery Sales and Service, Agricultural Supplies and Equipment, etc. (Poultry Industry was not included because of smallness of sample).

2. A similar count was made for the areas of forestry, soil conservation and outdoor recreation; agricultural business; agricultural mechanics, and animal science.

3. The results were entered in each instance in TABLE VIII under the "No. Comp." headings.

4. The cells containing numbers were shaded to separate them categorically from other cells.

5. The annual (full-time and part-time) employment opportunities per school district per occupational family (in 1969) were entered in the shaded cells under the heading "An. Emp. Op. /School."

6. The total annual employment opportunities per school district in which workers needed each area of competency was determined by addition and entered under "Total Annual Employment Opportunities Per School Needing Each Area of Competency."

TABLE VIII

AREAS OF AGRICULTURAL COMPETENCY MOST NEEDED BY WORKERS IN ELEVEN OCCUPATIONAL FAMILIES - WEIGHTED BY ANNUAL EMPLOYMENT OPPORTUNITIES

Occupational Families →	Ag. Mach. S. & S.	Ag. Sup. & Equip.	Dairy M. & P.	Lvstr. M. & P.	Other L. Ind.	Crops M. & P.	For. & S. C.	Wildlife & Rec.	Orn. Hort.	Ag. Service	Farm Service	Total annual employment opportunities per school needing each area of competency
↓ Areas of Competency	No.** comp. / An. emp. op/sch***	No. comp. / An. emp. op/sch	No. comp. / An. emp. op/sch	No. comp. / An. emp. op/sch	No. comp. / An. emp. op/sch	No. comp. / An. emp. op/sch	No. comp. / An. emp. op/sch	No. comp. / An. emp. op/sch	No. comp. / An. emp. op/sch	No. comp. / An. emp. op/sch	No. comp. / An. emp. op/sch	
Plant Science						3 / 5	14 / -*	8 / 1	30 / 1	10 / 5		12
Forestry, Soil Conservation & Outdoor Recreation							29 / -*	17 / 1		2 / 5		6
Agricultural Business	18 / 3	14 / 3	1 / 1	9 / -*	12 / -*	10 / 5	19 / -*	10 / 1	17 / 1	17 / 5	13 / -*	19
Agricultural Mechanics	8 / 3	8 / 3	2 / 1			2 / 5	12 / -*	12 / 1	11 / 1	6 / 5	8 / -*	19
Animal Science			4 / 1	7 / -*	12 / -*						5 / -*	1

*Less than one employment opportunity per school district
**No. comp. = Number of competencies each of which is needed by 20 per cent or more of the workers in this occupational family
***An. emp. op/sch = Annual employment opportunities per school district in this occupational family

Of the 19 annual employment opportunities per school district all were in occupational families where agricultural business competencies were needed, all were in occupational families where agricultural mechanics competencies were needed and 12 were in occupational families where workers needed competencies in plant science. The equivalent of six employment opportunities fell in occupational families needing competencies in forestry, soil conservation and outdoor recreation. One employment opportunity was in occupational families where animal science competencies were needed.

Minimum Education Required for Full-Time Workers in Off-Farm Agricultural Occupations

Employers reported that high school graduation was required for the majority (57 per cent) of full-time workers in off-farm agricultural occupations. TABLE IX. Seventeen per cent were reported to need less than high school education. A similar proportion (18 per cent) were reported to need various levels of education beyond high school.

The 18 per cent of workers in job titles requiring more than a high school education were distributed as follows: post-high school technical education (not a degree), ten per cent; associate or junior college degree, one per cent; some college education (not a degree), three per cent; baccalaureate degree, three per cent, and doctors degree, one per cent.

Employers indicated that level of education was not important for eight per cent of the workers.

B. OFF-FARM AGRICULTURAL OCCUPATIONS IN TWO SCHOOL DISTRICTS IN THE ADIRONDACK AREA, 1964

Job Titles of Off-Farm Agricultural Occupations and Proportion of Time Typical Workers Spend on Use of Agricultural Competencies

A total of 76 different job titles of off-farm agricultural occupations were found in the two school districts surveyed in the Adirondack area. All except seven of the job titles were located in the Dictionary of Occupational Titles. 12/ The 76 job titles are listed below by occupational family; in the order by which they were coded for data processing. In each case the job title is preceded by the D. O. T. Code Number (if located) and followed by the proportion of time which employers reported that a typical worker in this job title spent on tasks requiring agricultural competencies.

12/ Ibid.

TABLE IX

MINIMUM EDUCATION REQUIRED FOR FULL-TIME OFF-FARM AGRICULTURAL OCCUPATIONS

Occupational families	Per cent of workers in occupational families where the minimum requirement is									
	Not important	Less than high school graduation	High school graduation	Post-high school technical education (not a degree)	Associate or junior college degree	Some college education (not a degree)	Baccalaureate degree	Master's degree	Doctor's degree	Total
1. Agricultural Machinery Sales and Service	2	1	82	15	-	-	-	-	-	100
2. Agricultural Supplies and Equipment	5	38	54	2	-	-	1	-	-	100
3. Dairy Manufacturing and Processing	-	8	65	27	-	-	-	-	-	100
4. Livestock Marketing and Processing	3	28	65	-	4	-	-	-	-	100
5. Other Livestock Industry	-	25	7	21	4	4	-	-	39	100
6. Poultry Industry	-	-	33	67	-	-	-	-	-	100
7. Crops Marketing and Processing	59	-	27	13	-	-	1	-	-	100
8. Forestry and Soil Conservation	-	-	27	55	-	18	-	-	-	100
9. Wildlife and Recreation	-	10	47	27	2	14	-	-	-	100
10. Ornamental Horticulture	2	11	62	-	-	1	24	-	-	100
11. Farm Service	-	7	29	64	-	-	-	-	-	100
12. Agricultural Service	5	5	59	9	5	13	4	-	-	100
Per cent of all workers	8	17	57	10	1	3	3	-	1	100

D. O. T. Number	Job Titles by Occupational Families	Per Cent of Time Workers Use Agricultural Competencies
	AGRICULTURAL SUPPLIES AND EQUIPMENT	
0 - 72.71	* Manager	100
9 - 32.01	* Laborer	100
	DAIRY MANUFACTURING AND PROCESSING	
6 - 06.560	* Milk Inspector	75
	FORESTRY AND SOIL CONSERVATION	
0 - 35.07	Forester	100
0 - 35.07	Forest Ranger	90
0 - 35.03	Conservationist	100
0 - 68.23	* Fire Warden	78
8 - 30.10	Bush Cutter	75
3 - 40.16	Tree Trimming Foreman	85
3 - 40.18	Tree Trimming Groundman	75
5 - 97.901	* Foreman (agriculture and horticulture service)	100
7 - 89.121	Exterminator	100
9 - 61.11	Park Laborer	100
0 - 64.10	Forest Surveyor	100
9 - 54.20	Laborer	95
3 - 40.04	Grounds Keeper	87
	ORNAMENTAL HORTICULTURE	
3 - 38.20	* Manager	100
3 - 38.10	* Flower Raiser	100
3 - 39.10	* Greenhouse Laborer	100
	WILDLIFE AND RECREATION	
0 - 68.06	Fish Hatchery Foreman	100
0 - 35.12	* Wildlife Specialist	100
0 - 94.94	* Fish and Game Warden	50
7 - 61.110	* Park Caretaker	100
0 - 27.08	* Youth Camp Director	50
(Not found in D. O. T.)	* Camp Operator	90
9 - 61.11	* Camp Grounds Caretaker	50

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* Found also in one or more of the school districts offering instruction in agriculture during 1963-64.

D. O. T. Number	Job Titles by Occupational Families	Per Cent of Time Workers Use Agricultural Competencies
(Not found in D. O. T.)	Ski Slope Maintenance Man	50
(Not found in D. O. T.)	Ski Slope Equipment Operator	50
3 - 40.03	* Golf Course Greens Keeper	50
3 - 40.07	* Golf Course Laborer	50
0 - 88.24	* Marine Engine Mechanic	100
(Not found in D. O. T.)	Ski Slope Manager	90
(Not found in D. O. T.)	Assistant Camp Operator	50
0 - 97.12	Office Manager	90
1 - 05.01	Office Clerk	57
0 - 98.54	Store Manager	90
1 - 01.53	Store Cashier	90
0 - 98.54	* Manager (recreation establishment)	72
(Not found in D. O. T.)	Ski Shop Manager	75
(Not found in D. O. T.)	Assistant Manager	90
2 - 40.51	Recreation Facility Attendant	25
5 - 83.21	* Maintenance Man	93
0 - 27.08	* Camp Director	90
0 - 27.40	* Camp Counselor	69
2 - 61.11	* Lifeguard	90
2 - 40.26	Boat-Ride Operator	90
0 - 35.07	Forest Ranger	100
5 - 23.910	* Heavy Equipment Operator	100
0 - 35.07	Forester	100
1 - 37.12	Stenographer	91
0 - 35.22	Aquatic Biologist	100
9 - 61.11	Park Laborer	80
3 - 97.30	Wildlife Trapper	100
5 - 99.030	* Foreman (government service)	100
0 - 11.10	President, Educational Institution	80
0 - 11.50	College Professor	90
5 - 49.104	Lock Tender	50
1 - 33.01	Secretary	50
0 - 98.57	Municipal Recreation Executive	100
9 - 61.11	Laborer, Municipal Service	50
7 - 49.101	Motorboat Operator	100
0 - 66.41	Sanitary Technician	30
	AGRICULTURAL SERVICE	
0 - 06.71	* Agricultural Journalist	50
1 - 57.10	* Rural Insurance Representative	50
0 - 44.26	* Advertising Layout Man	60
1 - 36.02	Advertising Clerk	50
1 - 05.01	* General Office Clerk	50
0 - 74.21	Merchandise Manager (gift shop)	50
0 - 87.10	* Custodian	100

D. O. T. Number	Job Titles by Occupational Families	Per Cent of Time Workers Use Agricultural Competencies
5 - 30.210	* Plumber	50
0 - 72.71	* Manager	100
5 - 83.611	* Maintenance Man	100
4 - 35.720	Upholsterer	100
5 - 99.050	* Utilities and Maintenace Foreman	90
2 - 84.10	Janitor	100
0 - 16.01	Sanitary Engineer	50

Proportion of Time Devoted to Use of Agricultural Competencies in Various Families of Off-Farm Agricultural Occupations

According to employers' estimates, workers in the 76 off-farm agricultural occupations spent an average of 88 per cent of their work time on tasks requiring agricultural competencies. TABLE X. However, the proportion of time thus spent varied from 25 per cent for some job titles to 100 per cent for others.

Number of Persons Employed During 1964 in Off-Farm Agricultural Occupations in Two School Districts in the Adirondack Area

A total of 218 full-time workers in off-farm agricultural occupations were reported by employers interviewed in the two school districts in the Adirondack area. TABLE XI. One hundred and thirteen (52 per cent) were in 43 job titles in Wildlife and Recreation, 41 (19 per cent) were in 13 job titles in Forestry and Soil Conservation, 36 (17 per cent) were in 14 job titles in Agricultural Service and 24 (11 per cent) were in two job titles in Agricultural Supplies and Equipment.

An additional 165 part-time workers in off-farm agricultural occupations were reported by employers interviewed in the two school districts. The vast majority of part-time workers, 148 (90 per cent) were in 43 job titles in Wildlife and Recreation.

On a per school district basis there were 109 full-time and 83 part-time workers in off-farm agricultural occupations in the two school districts studied in the Adirondack area.

Classification of Workers by Levels of Employment

Employers interviewed in the two school districts of the Adirondack area classified their full-time workers in off-farm agricultural occupations by level of employment as follows: semi-skilled 34 per cent; professional and managerial, 17 per cent each; unskilled eight per cent; technical, clerical, service and skilled, six per cent each and sales less than one per cent. TABLE XII.

TABLE X

PROPORTION OF TIME DEVOTED TO USE OF AGRICULTURAL COMPETENCIES BY FULL-TIME WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS IN TWO SCHOOL DISTRICTS IN THE ADIRONDACK AREA, 1964

Occupational families	Number of different job titles	Range[1] (in per cent)	Mean[2] (in per cent)
1. Agricultural Machinery Sales and Service	-	-	-
2. Agricultural Supplies and Equipment	2	100	100
3. Dairy Manufacturing and Processing	1	75	75
4. Livestock Marketing and Processing	-	-	-
5. Other Livestock Industry	-	-	-
6. Poultry Industry	-	-	-
7. Crops Marketing and Processing	-	-	-
8. Forestry and Soil Conservation	12	75-100	92
9. Wildlife and Recreation	30	25-100	87
10. Ornamental Horticulture	3	100	100
11. Farm Service	-	-	-
12. Agricultural Service	14	50-100	85
Totals	62	-	-
Mean for all workers	-	-	88

[1] Between job titles in each occupational family

[2] Weighted by number of workers in each job title

TABLE XI

NUMBER OF PERSONS EMPLOYED IN OFF-FARM AGRICULTURAL OCCUPATIONS IN TWO SCHOOL DISTRICTS IN THE ADIRONDACK AREA, 1964

Occupational families	Number of different job titles represented	Persons employed during 1964			
		Full-time		Part-time	
		Number	Per cent	Number	Per cent
1. Agricultural Machinery Sales and Service	-	-	-	-	-
2. Agricultural Supplies and Equipment	2	24	11	1	-
3. Dairy Manufacturing and Processing	1	1	-	-	-
4. Livestock Marketing and Processing	-	-	-	-	-
5. Other Livestock Industry	-	-	-	-	-
6. Poultry Industry	-	-	-	-	-
7. Crops Marketing and Processing	-	-	-	-	-
8. Forestry and Soil Conservation	13	41	19	12	7
9. Wildlife and Recreation	43	113	52	148	90
10. Ornamental Horticulture	3	3	1	3	2
11. Farm Service	-	-	-	-	-
12. Agricultural Service	14	36	17	1	1
Totals	76	218	100	165	100
Per school district	-	109	-	83	-

TABLE XII

CLASSIFICATION OF FULL-TIME WORKERS BY LEVELS OF EMPLOYMENT IN OFF-FARM AGRICULTURAL OCCUPATIONS IN TWO SCHOOL DISTRICTS IN THE ADIRONDACK AREA, 1964

Occupational families	Number of workers classified									
	Professional	Managerial	Technical	Clerical	Sales	Service	Skilled	Semi-skilled	Unskilled	Totals
1. Agricultural Machinery Sales and Service	-	-	-	-	-	-	-	-	-	-
2. Agricultural Supplies and Equipment	-	6	-	-	-	-	-	18	-	24
3. Dairy Manufacturing and Processing	1	-	-	-	-	-	-	-	-	1
4. Livestock Marketing and Processing	-	-	-	-	-	-	-	-	-	-
5. Other Livestock Industry	-	-	-	-	-	-	-	-	-	-
6. Poultry Industry	-	-	-	-	-	-	-	-	-	-
7. Crops Marketing and Processing	-	-	-	-	-	-	-	-	-	-
8. Forestry and Soil Conservation	10	4	11	-	-	-	2	14	-	41
9. Wildlife and Recreation	22	23	2	9	-	13	6	23	15	113
10. Ornamental Horticulture	1	1	-	-	-	-	-	1	-	3
11. Farm Service	-	-	-	-	-	-	-	-	-	-
12. Agricultural Service	3	4	-	3	1	-	4	18	3	36
Totals	37	38	13	12	1	13	12	74	18	218
Per cent	17	17	6	6	-	6	6	34	8	100

Part-time workers were classified by employers as follows: unskilled 30 per cent, service 24 per cent, semi-skilled 18 per cent, skilled nine per cent, clerical seven per cent, technical six per cent, managerial five per cent, and sales one per cent. TABLE XIII.

Number of Persons Employers Predict Will Be Employed in 1969 in Off-Farm Agricultural Occupations in Two School Districts in the Adirondack Area

Employers in the two school districts predicted that they would employ 287 full-time workers in off-farm agricultural occupations by 1969; compared to 218 in 1964. TABLE XIV. Of the 287 full-time workers it was predicted that 146 (51 per cent) would be in 43 job titles in Wildlife and Recreation, 65 (23 per cent) would be in 13 job titles in Forestry and Soil Conservation, 48 (17 per cent) would be in 14 job titles in Agricultural Service and 24 (eight per cent) would be in two job titles in Agricultural Supplies and Equipment.

Employers further predicted that they would employ 211 part-time workers in off-farm agricultural occupations by 1969; compared to 165 in 1964. Of the 211 it was predicted that 185 (88 per cent) would be in 43 job titles in Wildlife and Recreation and 20 (ten per cent) would be in 13 job titles in Forestry and Soil Conservation.

On a per school district basis, it appeared that there would be an average of 144 persons employed full-time and 106 persons employed part-time in off-farm agricultural occupations in 1969 in the two school districts studied in the Adirondack area.

The predicted increase of 69 full-time workers represented a 32 per cent growth rate over the five-year period. The study also indicated that the most rapid rate of growth for full-time workers would take place in Forestry and Soil Conservation (59 per cent), Agricultural Service (33 per cent) and Wildlife and Recreation (29 per cent).

The predicted increase of 46 part-time workers represented a 28 per cent growth rate over the five-year period. The study also revealed that the most rapid rate of growth for part-time workers would take place in Forestry and Conservation (67 per cent).

Employment Opportunities Outlook in Off-Farm Agricultural Occupations in Two School Districts in the Adirondack Area, 1964-69

It was estimated that during the five-year period 1964-69, a total of 314 employment opportunities would be available in the off-farm agricultural occupations in the two school districts. TABLE XV. Of this number, 148 would be in full-time jobs and 166 would be in part-time employment. An individual school district might anticipate 157 employment opportunities over the five-year period; 74 full-time and 83 part-time. On a per school district, per year basis, the study showed an average of 31 employment opportunities; 15 in full-time and 16 in part-time jobs. It should be emphasized that this estimate did not include those who would enter farming or those who would find employment in off-farm agricultural occupations outside of the two school districts.

TABLE XIII

CLASSIFICATION OF PART-TIME WORKERS BY LEVELS OF EMPLOYMENT IN OFF-FARM AGRICULTURAL OCCUPATIONS IN TWO SCHOOL DISTRICTS IN THE ADIRONDACK AREA, 1964

Occupational families	Number of workers classified									Totals
	Professional	Managerial	Technical	Clerical	Sales	Service	Skilled	Semi-skilled	Unskilled	
1. Agricultural Machinery Sales and Service	-	-	-	-	-	-	-	-	-	-
2. Agricultural Supplies and Equipment	-	1	-	-	-	-	-	-	-	1
3. Dairy Manufacturing and Processing	-	-	-	-	-	-	-	-	-	-
4. Livestock Marketing and Processing	-	-	-	-	-	-	-	-	-	-
5. Other Livestock Industry	-	-	-	-	-	-	-	-	-	-
6. Poultry Industry	-	-	-	-	-	-	-	-	-	-
7. Crops Marketing and Processing	-	-	-	-	-	-	-	-	-	-
8. Forestry and Soil Conservation	-	-	-	-	-	-	2	1	9	12
9. Wildlife and Recreation	-	7	10	10	2	40	13	25	41	148
10. Ornamental Horticulture	-	-	-	-	-	-	-	3	-	3
11. Farm Service	-	-	-	-	-	-	-	-	-	-
12. Agricultural Service	-	-	-	1	-	-	-	-	-	1
Totals	-	8	10	11	2	40	15	29	50	165
Per cent	-	5	6	7	1	24	9	18	30	100

TABLE XIV

NUMBER OF PERSONS EMPLOYERS PREDICT WILL BE EMPLOYED IN 1969 IN OFF-FARM AGRICULTURAL OCCUPATIONS IN TWO SCHOOL DISTRICTS IN THE ADIRONDACK AREA

Occupational families	Number of different job titles represented	Predicted employment 1969					
		Full-time			Part-time		
		Number	Per cent	Per cent increase over 1964	Number	Per cent	Per cent increase over 1964
1. Agricultural Machinery Sales and Service	-	-	-	-	-	-	-
2. Agricultural Supplies and Equipment	2	24	8	-	1	-	-
3. Dairy Manufacturing and Processing	1	1	-	-	-	-	-
4. Livestock Marketing and Processing	-	-	-	-	-	-	-
5. Other Livestock Industry	-	-	-	-	-	-	-
6. Poultry Industry	-	-	-	-	-	-	-
7. Crops Marketing and Processing	-	-	-	-	-	-	-
8. Forestry and Soil Conservation	13	65	23	59	20	10	67
9. Wildlife and Recreation	43	146	51	29	185	88	25
10. Ornamental Horticulture	3	3	1	-	3	1	-
11. Farm Service	-	-	-	-	-	-	-
12. Agricultural Service	14	48	17	33	2	1	50
Totals	76	287	100	-	211	100	-
Per school district	-	144	-	32	106	-	28

TABLE XV

EMPLOYMENT OPPORTUNITIES OUTLOOK IN OFF-FARM AGRICULTURAL OCCUPATIONS IN TWO SCHOOL DISTRICTS IN THE ADIRONDACK AREA, 1965-69

Occupational families	Employment opportunities by years									
	1965		1966		1967		1968		1969	
	Full-time	Part-time	Full-time	Part-time	Full-time	Part-time	Full-time	Part-time	Full-time	Part-time
1. Agricultural Machinery Sales and Service	-		-		-		-		-	
2. Agricultural Supplies and Equipment	1	*	1	*	1	*	1	*	1	*
3. Dairy Manufacturing and Processing	*	-	*	-	*	-	*	-	*	-
4. Livestock Marketing and Processing	-	-	-	-	-	-	-	-	-	-
5. Other Livestock Industry	-	-	-	-	-	-	-	-	-	-
6. Poultry Industry	-	-	-	-	-	-	-	-	-	-
7. Crops Marketing and Processing	-	-	-	-	-	-	-	-	-	-
8. Forestry and Soil Conservation	8	4	8	4	8	4	8	4	9	5
9. Wildlife and Recreation	15	25	15	26	16	27	16	28	17	29
10. Ornamental Horticulture	*	1	*	1	*	1	*	1	*	1
11. Farm Service	-	-	-	-	-	-	-	-	-	-
12. Agricultural Service	4	1	4	1	5	1	5	1	5	1
Totals	28	31	28	32	30	33	30	34	32	36
Per school district	14	15.5	14	16	15	16.5	15	17	16	18

* Less than one

Employment opportunities for full-time workers were highest in Wildlife and Recreation, Forestry and Soil Conservation and Agricultural Service. Opportunities for part-time workers were greatest in Wildlife and Recreation, and Forestry and Soil Conservation.

Agricultural Competencies Needed by Workers in Off-Farm Agricultural Occupations in Two School Districts in the Adirondack Area

The agricultural competencies cited by employers as most frequently needed by their workers are listed below for each occupational family. They are listed in rank order beginning with the one needed by the highest proportion of full-time workers in each occupational family. Only the top quartile of the rankings are listed. Complete lists may be found in APPENDIX E.

In the cases of Agricultural Supplies and Equipment and Dairy Manufacturing and Processing, it was impossible to follow this procedure because all of the needed competencies received equal ranking; therefore, all are listed with no inherent order.

AGRICULTURAL SUPPLIES AND EQUIPMENT

1. Use fire fighting tools and equipment.
2. Operate chain saws and other power equipment.
3. Maintain fire fighting tools and equipment.
4. Select, repair and maintain chain saws.
5. Keep essential records.
6. Know insurance and safety regulations.
7. Plan and arrange for advertising and promotion.
8. Handle inventories, stock control, warehousing reports, payroll, accounts.
9. Sell machinery, equipment, materials, products or supplies.
10. Make job estimates.
11. Purchase goods to sell.
12. Hire, train and supervise workers.
13. Call on prospective customers.
14. Investigate and adjust customer complaints.
15. Display, explain and demonstrate items for sale.
16. Order repair parts and new equipment.
17. Use legal instruments: wills, deeds, contracts, mortgages, notes.
18. Keep, summarize, and analyze records.
19. Evaluate the total operation and make decisions.
20. Understand and use credit.
21. Comply with local, state and federal government trade and licensing regulations.
22. Provide for insurance.
23. Prepare tax returns.
24. Understand agriculture in our economy.
25. Select and buy farm machinery or garden tools, equipment, and machinery.
26. Select, buy, adjust or maintain lawn and garden sprinkler and irrigation equipment.

27. Operate, maintain and adjust gasoline engines.
28. Knowledge of blueprints, space requirements and building materials for agricultural structures.
29. Arrange, organize, and manage an agricultural shop facility.
30. Knowledge of fuels and lubricants.
31. Planning for efficient use of buildings and equipment.
32. Install and use materials handling equipment.
33. Knowledge of paint and painting.

DAIRY MANUFACTURING AND PROCESSING

1. Manage streams and ponds.
2. Keep essential records.
3. Know public health laws.
4. Know insurance and safety regulations.
5. Manage camp grounds and trailer camps.
6. Hire, train and supervise workers.
7. Use legal instruments: wills, deeds, contracts, mortgages, notes.
8. Keep, summarize and analyze records.
9. Evaluate the total operation and make decisions.
10. Understand agriculture in our economy.
11. Plan, install and adjust water or sewage systems.
12. Knowledge of blueprints, space requirements and building materials for agricultural structures.
13. Concrete, masonry, and tile skills.
14. Planning for efficient use of buildings and equipment.
15. Install and use materials handling equipment.
16. Knowledge of paint and painting.
17. Housing and handling.
18. Feeding requirements and practices.
19. Sanitation and disease control practices.
20. Produce high quality products.
21. Knowledge of grades and standards.
22. Ability to test animal products.
23. Knowledge of markets and marketing practices.

FORESTRY AND SOIL CONSERVATION

1. Keep essential records.
2. Make job estimates.
3. Identify trees of economic importance.
4. Use fire fighting tools and equipment.
5. Operate chain saws and other power equipment.
6. Maintain fire fighting tools and equipment.
7. Detect and report forest fires.
8. Hire, train and supervise workers.
9. Operate, maintain and adjust diesel engines.
10. Read a topographical map.
11. Fell, trim, skid and haul logs and pulp.
12. Knowledge of fuels and lubricants.
13. Know insurance and safety regulations.

14. Understand agriculture in our economy.
15. Organize a fire crew.
16. Lay out, build and open woods roads.
17. Select, repair and maintain chain saws.
18. Knowledge of paint and painting.
19. Maintain trees and shrubs.
20. Scale and grade saw logs.
21. Handle inventories, stock control, warehousing, reports, payrolls, accounts.
22. Keep, summarize and analyze records.
23. Know public health laws.
24. Repair and maintain tree planting equipment.
25. Identify and control common insects and diseases.
26. Determine land use capabilities.
27. Order repair parts and new equipment.
28. Evaluate the total operation and make decisions.

WILDLIFE AND RECREATION

1. Knowledge of paint and painting.
2. Knowledge of fuels and lubricants.
3. Operate, maintain and adjust gasoline engines.
4. Farm carpentry.
5. Operate, maintain and adjust garden machines and equipment.
6. Plan, install and adjust water or sewage systems.
7. Use fire fighting tools and equipment.
8. Operate boats and motors.
9. Operate, maintain and adjust tractors, trucks, agricultural equipment and agricultural machinery.
10. Concrete, masonry and tile skills.
11. Operate chain saws and other power equipment.
12. Maintain and keep fire fighting tools and equipment.
13. Maintain and repair boats and motors.
14. Woodworking or metal working tool skills.
15. Keep essential records.
16. Fell, trim, skid and haul logs and pulp.
17. Know insurance and safety regulations.
18. Order repair parts and new equipment.
19. Keep, summarize and analyze records.
20. Plan, install, repair and maintain electrical systems.
21. Detect and report forest fires.
22. Planning for efficient use of buildings and equipment.
23. Handle inventories, stock control, warehousing reports, payrolls, accounts.
24. Know public health laws.
25. Comply with local, state and federal government trade and licensing regulations.
26. Know game laws.
27. Evaluate the total operation and make decisions.
28. Identify trees of economic importance.
29. Understand agriculture in our economy.
30. Arc or oxy-acetylene welding abilities.

ORNAMENTAL HORTICULTURE

1. Mix soil composites.
2. Sterilize soil.
3. Prepare seed beds.
4. Select and use appropriate plant propagation methods.
5. Determine proper rooting medium.
6. Plant seeds, bulbs, trees or shrubs.
7. Perform proper tillage practices.
8. Design and make flower arrangements, corsages, floral pieces and Christmas decorations.
9. Maintain lawns.
10. Maintain trees and shrubs.
11. Provide seasonal protection for ornamental plants.
12. Harvest crops or plants.
13. Process, grade or package.
14. Shipping or storing.
15. Maintain and repair turf equipment such as mowers, fertilizer spreaders, and irrigation equipment.
16. Operate turf equipment such as mowers, fertilizer spreaders and irrigation equipment.
17. Sell machinery, equipment, materials, products or supplies.
18. Purchase goods to sell.
19. Display, explain and demonstrate items for sale.
20. Woodworking or metal working skills.
21. Operate, maintain and adjust tractors, trucks, agricultural equipment and agricultural machinery.
22. Operate, maintain and adjust gasoline engines.
23. Operate, maintain and adjust garden machines and equipment.
24. Construct and maintain greehouses, headhouses, pathhouses, or toolsheds.
25. Knowledge of paint and painting.

AGRICULTURAL SERVICE

1. Know insurance and safety regulations.
2. Knowledge of paint and painting.
3. Operate, maintain and adjust gasoline engines.
4. Knowledge of fuels and lubricants.
5. Use fire fighting tools and equipment.
6. Operate turf equipment such as mowers, fertilizer spreaders and irrigation equipment.
7. Sanitation and disease control practices.
8. Operate chain saws and other power equipment.
9. Maintain fire fighting tools and equipment.
10. Maintain and repair turf equipment such as mowers, fertilizer spreaders, irrigation equipment.
11. Operate, maintain and adjust garden machines and equipment.
12. Maintain lawns.
13. Maintain trees and shrubs.
14. Know public health laws.
15. Organize a fire crew.

16. Control soil erosion.
17. Shipping and storing.
18. Read a topographical map.
19. Keep, summarize and analyze records.
20. Woodworking or metal working tool skills.
21. Keep essential records.
22. Maintain and repair boat coverings.
23. Make job estimates.
24. Use legal instruments: wills, deeds, contracts, mortgages, notes.
25. Evaluate the total operation and make decisions.
26. Plan, install and adjust water or sewage systems.
27. Knowledge of blueprints, space requirements and building materials for agricultural structures.
28. Farm carpentry.

Areas of Agricultural Competency Most Needed by Workers in Various Occupational Families

The five areas of agricultural competency - plant science; forestry, soil conservation and outdoor recreation; agricultural business; agricultural mechanics, and animal science - were weighted by annual employment opportunities per school district, using the procedure described on page 73, and the results were entered in TABLE XVI.

All of the 33 annual employment opportunities per school district were in occupational families where forestry, soil conservation and outdoor recreation; agricultural business, and agricultural mechanics competencies were needed. Ten annual employment opportunities per school district were in occupational families where plant science competencies were needed. Three annual employment opportunities fell in occupational families needing competencies in animal science.

Minimum Education Required for Off-Farm Agricultural Occupations in Two School Districts in the Adirondack Area

Employers reported that high school graduation was required for 37 per cent and that less than high school education was required for 11 per cent of the full-time workers in off-farm agricultural occupations in the two school districts. TABLE XVII. They also reported that post-high school technical education (not a degree) was required for 29 per cent of the workers, baccalaureate degreefor 11 per cent, associate or junior college degree for five per cent, masters degree for five per cent and some college education (not a degree) for two per cent of the workers.

TABLE XVI

AREAS OF AGRICULTURAL COMPETENCY MOST NEEDED BY WORKERS IN SIX OCCUPATIONAL FAMILIES IN TWO SCHOOL DISTRICTS IN THE ADIRONDACK AREA - WEIGHTED BY ANNUAL EMPLOYMENT OPPORTUNITIES PER SCHOOL DISTRICT, 1969

Areas of competency	Ag. Sup. & Equip.		Dairy M. & P.		Forestry & Soil Conservation		Wildlife and Recreation		Orn. Hort.		Agric. Service		Total annual employment opportunities per school needing each area of competency
	No.** comp.	*** An. emp. op/sch	No. comp.	An. emp. op/sch	No. comp.	An. emp. op/sch	No. comp.	An. emp. op/sch	No. comp.	An. emp. op/sch	No. comp.	An. emp. op/sch	
Plant Science					12	7			30	*	3	3	10
Forestry, Soil Conservation & Outdoor Rec.	6	1	5	*	28	7	25	22	10	*	14	3	33
Agricultural Business	18	1	5	*	12	7	12	22	17	*	12	3	33
Agricultural Mechanics	9	1	6	*	11	7	13	22	15	*	15	3	33
Animal Science			7	*							1	3	3

---

* Less than one

** No. comp. = Number of competencies each of which is needed by 20 per cent or more of the workers in this occupational family.

*** An. emp. op/sch = Annual employment opportunities per school district in this occupational family.

TABLE XVII

MIMIMUM EDUCATION REQUIRED FOR FULL-TIME WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS IN TWO SCHOOL DISTRICTS IN THE ADIRONDACK AREA, 1964

Occupational families	Per cent of workers in occupational families where the minimum requirement is									
	Less than high school graduation	High school graduation	Post-high school tech. ed. (no deg.)	Assoc. or jr. coll. degree	Some college ed. (no deg.)	Baccalaureat degree	Master's degree	Doctor's degree	Not important	Total
1. Agricultural Machinery Sales and Service	-	-	-	-	-	-	-	-	-	-
2. Agricultural Supplies and Equipment	-	-	100	-	-	-	-	-	-	100
3. Dairy Manufacturing and Processing	-	-	-	-	-	100	-	-	-	100
4. Livestock Marketing and Processing	-	-	-	-	-	-	-	-	-	-
5. Other Livestock Industry	-	-	-	-	-	-	-	-	-	-
6. Poultry Industry	-	-	-	-	-	-	-	-	-	-
7. Crops Marketing and Processing	-	-	-	-	-	-	-	-	-	-
8. Forestry and Soil Conservation	2	42	37	12	-	7	-	-	-	100
9. Wildlife and Recreation	18	42	12	4	1	13	10	-	-	100
10. Ornamental Horticulture	-	34	-	-	33	33	-	-	-	100
11. Farm Service	-	-	-	-	-	-	-	-	-	-
12. Agricultural Service	8	44	31	-	6	11	-	-	-	100
Per cent of all workers	11	37	29	5	2	11	5	-	-	100

CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS FOR FURTHER STUDY

The following conclusions, implications and recommendations for further study were made and interpreted within the framework of the basic assumptions underlying the study and with due recognition given to the previously stated limitations.

A. CONCLUSIONS

Concerning School Districts Offering Instruction in Agriculture

1. Off-farm agricultural occupations are found in businesses or services with diverse functions. Although concentrated most heavily in service and retail sales, they are also found in manufacturing or processing, wholesaling, recreation, specialized agricultural production (other than farming) and education.

2. The job titles of most off-farm agricultural occupations can be found in the Dictionary of Occupational Titles.[13] However, they are usually classified under headings other than agriculture.

3. There is a vast array of separate and distinct job titles in which workers use agricultural competencies. Two hundred and thirteen were identified in this phase of the study (plus 43 additional titles in the Adirondack area). The proportion of time devoted to the use of such competencies on the job varies widely with job titles. However, on the average, workers in off-farm agricultural occupations use agricultural competencies a high proportion of the time (in this study 83 per cent). The average for workers in the various occupational families vary but little in this regard.

4. The number of persons employed in off-farm agricultural occupations is substantial. It was estimated that 28,685 full-time workers and 16,841 part-time workers were thus employed in the 260 school districts offering agricultural instruction during the school year 1963-64. On a per school district basis it was estimated that there were 110 full-time and 65 part-time persons so employed.

5. Although full-time workers in off-farm agricultural occupations are found at all levels of employment, they are most frequently found in semi-skilled, skilled and managerial positions. Part-time workers are most likely to be found in semi-skilled positions.

6. The number of persons employed in off-farm agricultural occupations is increasing. Employers' estimates indicate a growth rate of 19 per cent for full-time workers between 1964 and 1969, and a growth rate of 13 per cent in part-time workers during the same period.

---

[13] Ibid.

7. The employment opportunities outlook in off-farm agricultural occupations is favorable. It is estimated that 14,085 full-time and 9,948 part-time employment opportunities will be available in such occupations during the five-year period 1964-69 in the 260 school districts studied. In view of the fact that no large urban areas were included in the study and that approximately one-third of the school districts in the State offer instruction in agriculture, it is entirely possible that several times the 4,807 employment opportunities found in this study will be available each year for the foreseeable future in New York State.

8. When the areas of agricultural competency most needed by workers in the several occupational families are weighted by the annual employment opportunities per school district, it appears that training programs should emphasize the development of competencies in:

    (a) Agricultural business and agricultural mechanics for prospective workers in all occupational families.
    (b) Plant science for prospective workers in Crops Marketing and Processing, Forestry and Soil Conservation, Wildlife and Recreation, Ornamental Horticulture and Agricultural Service occupations.
    (c) Animal science for prospective workers in Dairy Manufacturing and Processing, Livestock Marketing and Processing, Other Livestock Industry and Farm Service occupations.
    (d) Forestry, Conservation and Outdoor Recreation for prospective workers in these fields.

9. A high school education is sufficient for full-time workers in the vast majority of off-farm agricultural occupations but advanced training is a definite requirement in some job titles. Employer reports indicate that only 17 per cent of such workers need more than a high school education. However, job titles such as county agricultural agent, teacher of agriculture and veterinarian require advanced training for entrance.

Concerning School Districts in the Adirondack Area

1. Off-farm agricultural occupations are found most frequently in businesses or services whose main functions are service, recreation or retail sales. However, they are also found occasionally in businesses or services whose main functions are education and specialized agricultural production (other than farming).

2. The job titles of most off-farm agricultural occupations can be found in the Dictionary of Occupational Titles. 14/ However, they are usually classified under headings other than agriculture.

14/ Ibid.

3. There is a vast array of job titles in which workers use agricultural competencies. Seventy-six such job titles were located in the two school districts studied in the Adirondack area. The proportion of time devoted to the use of such competencies varies widely with job titles. However, on the average, workers in off-farm agricultural occupations use agricultural competencies a high proportion of the time (in this study 88 per cent).

4. The number of persons employed in off-farm agricultural occupations is substantial. An average of 109 full-time and 83 part-time persons were so employed in the two school districts studied in the Adirondack area.

5. Full-time workers in off-farm agricultural occupations are found at all levels of employment but most frequently in semi-skilled, managerial and professional positions. Part-time workers are most likely to be found in unskilled, service and semi-skilled jobs.

6. Employment in off-farm agricultural occupations is increasing. Employers estimates indicate a growth rate of 32 per cent for full-time workers between 1964 and 1969, and a growth rate of 28 per cent for part-time workers during the same period.

7. The outlook for employment opportunities in off-farm agricultural occupations is favorable. It is estimated that there will be 314 (148 full-time and 166 part-time) employment opportunities in such occupations during the five-year period 1964-69 in the two school districts studied. An average of 31 annual employment opportunities (15 in full-time and 16 in part-time jobs) are indicated per school district; not counting employment opportunities outside of the school district.

8. Training programs for off-farm agricultural occupations in the Adirondack area should emphasize development of the agricultural competencies needed in three occupational families: Wildlife and Recreation, Forestry and Soil Conservation and Agricultural Service. The higheset priorities in such training programs should be placed on the development of appropriate competencies in the areas of agricultural mechanics; agricultural business, and forestry, conservation and outdoor recreation.

9. A high school education is sufficient for approximately one-half of the workers in full-time off-farm agricultural occupations in the Adirondack area. Employer reports indicate that varying degrees of advanced training are required for the remaining positions.

B. IMPLICATIONS

1. High school agriculture programs in New York State must be vastly expanded if the demand for workers in the off-farm agricultural occupations is to be filled with agriculturally trained individuals. Existing high school agriculture programs in the State are graduating approximately 1558 young men (1964). Of this number, approximately 431 enter farming immediately, 420 continue their education full-time in colleges or other schools, and 220 enter the armed forces. Approximately 487 are available to compete for the estimated 2817 annual employment opportunities in off-farm agricultural occupations in their own school districts; not to mention employment opportunities in school districts not offering instruction in agriculture or those in large urban centers. The Vocational Education Act of 1963 clearly states that "any amounts allotted ... for agriculture (instruction) may be used for vocational education in any occupation involving knowledge and skills in agricultural subjects whether or not such occupations involve work of the farm ..." 15/

2. The employment opportunities outlook in off-farm agricultural occupations provides justification for the inclusion of the agricultural program in the developing area vocational schools. For example, an area vocational school established in a non-metropolitan area of New York State, serving eight school districts, could anticipate approximately 152 annual employment opportunities (88 full-time and 64 part-time) for which graduates in off-farm agricultural occupations could compete within the area served, and a somewhat larger number in the Adirondack area.

3. The expanded agriculture program in area vocational schools in non-metropolitan areas should include training in agricultural business, agricultural mechanics and plant science; in addition to preparation for farming where needed. In the Adirondack area training programs should emphasize the needs of workers in Wildlife and Recreation, Forestry and Agricultural Service occupations.

4. The agriculture course of study in school districts presently offering instruction in agriculture should be expanded to provide greater opportunity for preparation for off-farm agricultural occupations.

5. Training programs for off-farm agricultural occupations should embrace the areas of agricultural competency most needed by workers in those families and groups of families of occupations in which the largest proportion of employment opportunities are found in the geographical area in which the school plans to place its graduates. The findings of this study suggest that the agricultural competencies needed by workers in the several job titles of closely related families of occupations are sufficiently similar to provide a logical core for instructional programs.

15/ Committee on Labor and Public Welfare, United States Senate, loc. cit.

6. The State Education Department should develop suggested courses of study in Agricultural Business; Agricultural Mechanics; Plant Science; Forestry, Conservation and Outdoor Recreation which are based on the agricultural competencies needed by workers in off-farm agricultural occupations. This material should then be made readily available for the guidance of school administrators, guidance counselors and other persons charged with responsibility for planning educational programs.

7. It is apparent that many school districts adjoining or near those presently offering instruction in agriculture are very likely to have employment opportunities in off-farm agricultural occupations which would justify offering agricultural instruction either on their own or as a program of a Board of Cooperative Educational Service.

8. Certification requirements and pre-service training programs for teachers of agriculture presently based on the needs of students preparing for farming should be revised in view of the competencies needed by workers in off-farm agricultural occupations.

9. In-service training programs for employed teachers will be needed to assist them in acquiring the essential competencies needed for implementing training programs in off-farm agricultural occupations.

C. RECOMMENDATIONS FOR FURTHER STUDY

Some of the urgently needed research in the area of off-farm agricultural occupations includes:

1. A study utilizing a sample selected in such a way that the researchers could make projections beyond the school districts offering instruction in agriculture.

2. A concentrated study of off-farm agricultural occupations in the urban areas of New York State.

3. Pilot programs to try out and refine training programs in agricultural business; agricultural mechanics; plant science, and forestry, conservation and rural recreation for persons in off-farm agricultural occupations.

4. A study of work experience programs appropriate for persons in off-farm agricultural occupations.

5. The development of appropriate tests to determine aptitutde for and interest in various fields of off-farm agricultural occupations.

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APPENDIX A

EMPLOYMENT OPPORTUNITIES AND NEEDED COMPETENCIES IN OFF-FARM AGRICULTURAL OCCUPATIONS IN NEW YORK STATE

Date of Interview ________________

Interviewer ____________________

FORM A

Business or Service Information

Instruction: Complete a FORM A for each business or service employing one or more persons (including proprietor) who need agricultural competencies.

I. Name of Business or Service ______________________________

Address ______________________________

II. Name of Person Interviewed ______________________________

III. Telephone Number of Person Interviewed (Area Code) _____ (No.) __________

(Extension) _____

DO NOT WRITE IN THIS SECTION

School District Code Number ☐☐

IV. Business or Service Identification Number ☐☐☐

V. Main Function(s) of Business or Service. (Indicate by placing a 1 on the line preceding main function and a 2 on the line preceding secondary function, if any.

_____1. Retail Sales
_____2. Service
_____3. Manufacturing or Processing
_____4. Education
_____5. Wholesaling
_____6. Specialized Agricultural Production
_____7. Recreation
_____8. Other (list) __________

Use This Area For Matching Sections I and II of FORM B

EMPLOYMENT OPPORTUNITIES AND NEEDED COMPETENCIES IN OFF-FARM AGRICULTURAL OCCUPATIONS IN NEW YORK STATE

FORM B

SECTION I

Instruction: Complete a separate copy of this form for each and every different job title in which agricultural competencies are needed at each business or service establishment.

DO NOT WRITE IN THIS SECTION

School District Code Number ____

I. Business or Service Identification Number ☐☐☐
(Must always agree with FORM A for this business or service - NEVER LEAVE BLANK)

II. Occupational Family and Job Title

A. Occupational Family ____________________

B. Job Title ____________________
(Use back of this page to describe this job)

DO NOT WRITE IN THIS SECTION

Job Title Code Number ☐☐☐☐

C. Level of Employment of this Job Title. Check (√) one.

____ 1. Professional
____ 2. Managerial
____ 3. Technical
____ 4. Clerical
____ 5. Sales
____ 6. Service
____ 7. Skilled
____ 8. Semi-skilled
____ 9. Unskilled

III. Outlook for Employment in This Job Title

Employment Status	Number of Employees This Year	Number of Employees Expected Five Years from Now	Number of Years an Employee Usually Stays in this Job Title
Full-time	____ 1.	____ 2.	____ 3.
Part-time	____ 4.	____ 5.	____ 6.

DESCRIPTION OF JOB TITLE

List of Duties of Employee - What He Does	To What Does He Do This?	Where Is This Duty Performed?
1.		
2.		
3.		

Instruction: Circle the number above preceding the duty to which he devotes the *most* time.

EXAMPLE

List of Duties of Employee - What He Does	To What Does He Do This?	Where Is This Duty Performed?
1. Sells supplies	Picnic foods	At campsite
2. Cleans up	Camp grounds	Outside
3. Answers inquiries	Campers	Outside

Use This Area For Matching SECTIONS I And II of FORM B

FORM B

SECTION II

Instructions:

1. Complete a separate SECTION II for each and every different job title in each occupational family the first time it is encountered.
2. Do not complete a second SECTION II for the same job title in the same occupational family.
3. When you have completed SECTION II staple it to the completed FORM B, SECTION I for this job title in this business or service.

I. Agricultural Competencies Needed in this Job Title.

Directions: 1. Circle the number preceding each of the following competencies needed by a typical employee holding this job title in this business or service.

2. Write in additional competencies needed in appropriate blank spaces and circle the numbers preceding your additions.

Plant Science

(27) 1. Sample soil for complete test.
2. Perform ph or nutrient tests.
3. Make lime or fertilizer recommendations.
4. Recommend soil management practices.
5. Decide what to grow.
6. Choose proper planting sites.
7. Mix soil composites.
8. Sterilize soil.
9. Select varieties.
10. Select seed, cuttings, bulbs or stock plants.

(28) 11. Prepare seed bed.
12. Select and use appropriate plant propagation methods.
13. Determine proper rooting medium.
14. Plant seeds, bulbs, trees or shrubs.
15. Perform proper tillage practices.
16. Control birds and animals injurious to plants.
17. Control insects, diseases and weeds.
18. Manage greenhouse, provide proper environment, forcing and shading.
19. Manage nursery, planting, transplanting, pruning, shaping and trimming.
20. Design and make flower arrangements, corsages, floral pieces and Christmas decorations.

(29) 21. Knowledge of characteristics and appropriate use of landscaping materials.
22. Design landscaping plans to effectively use trees, shrubs, lawn, foundation plantings, vines and ground covers, annual and perennial flowers.
23. Correct physical defects of sites being landscaped.
24. Locate and design drives, walks, fences.
25. Establish lawns.
26. Maintain lawns.
27. Maintain trees and shrubs.
28. Provide seasonal protection to ornamental plants.
29. Harvest crops or plants.
30. Process, grade or package.

(30) 31. Shipping or storing.
32.
33.
34.
35.
36.
37.
38.
39.
40.

Forestry, Conservation and Rural Recreation

(33) 41. Identify trees of economic importance.
42. Reforest an area.
43. Manage reforested area.
44. Manage Christmas tree plantations.
45. Select and mark trees for cutting.
46. Estimate volume and tree stands.
47. Identify and control common insects and diseases.
48. Construct and maintain fire lanes.
49. Use fire fighting tools and equipment.
50. Detect and report forest fires.

(34) 51. Organize a fire crew.
52. Read a topographical map.
53. Scale and grade saw logs.
54. Fell, trim, skid and haul logs and pulp.
55. Operate chain saws and other power equipment.
56. Cut, bail, load, grade and haul Christmas trees.
57. Saw, grade, store and haul lumber.
58. Tap trees and operate maple syrup production equipment.
59. Control soil erosion.
60. Determine land use capabilities.

(35) 61. Repair and maintain tree planting equipment.
62. Maintain fire fighting tools and equipment.
63. Lay out, build and open woods roads.
64. Select, repair and maintain chain saws.
65. Maintain and repair turf equipment such as mowers, fertilizer spreaders and irrigation equipment.
66. Maintain and repair ski tows and lifts.
67. Maintain and repair boats and motors.
68. Identify economically important wildlife species.
69. Trap and control nuisance wildlife.
70. Provide habitat for bird and animal life.

(36) 71. Stock streams and ponds.
72. Manage wildlife in confinement.
73. Know game laws.
74. Manage streams and ponds.
75. Keep essential records.
76. Know public health laws.
77. Know insurance and safety regulations.
78. Manage camp grounds and trailer camps.
79. Care for riding horses.
80. Know fishing and hunting skills.

(37) 81. Operate turf equipment such as mower, fertilizer spreaders and irrigation equipment.
82. Manage ski tow slopes and trails.
83. Layout and maintain hiking trails.
84. Operate boats and motors.
85.
86.
87.
88.
89.
90.

Agricultural Business Management

(40) 91. Plan and arrange for advertising and promotion.
92. Handle inventories, stock control, warehousing reports, payrolls, accounts.
93. Sell machinery, equipment, materials, products or supplies.
94. Solicit subscribers to various types of agricultural service.
95. Make job estimates.
96. Purchase goods to sell.
97. Supervise installation of equipment.
98. Hire, train and supervise workers.
99. Call on prospective customers.
100. Investigate and adjust customer complaints.

(41) 101. Display, explain and demonstrate items for sale.
102. Order repair parts and new equipment.
103. Use legal instruments: wills, deeds, contracts, mortgages, notes.
104. Keep, summarize and analyze records.
105. Evaluate the total operation and make decisions.
106. Understand and use credit.
107. Comply with local, state and federal government trade and licensing regulations.
108. Provide for insurance.
109. Prepare tax returns.
110. Understand agriculture in our economy.

(42) 111.
112.
113.
114.
115.
116.
117.
118.
119.
120.

Agricultural Mechanics

(44) 121. Select and buy farm machinery or garden tools, equipment and machinery.
122. Select, buy, adjust or maintain lawn and garden sprinkler and irrigation equipment.
123. Woodworking or metal working tool skills.
124. Arc or oxy-acetylene welding abilities.
125. Operate, maintain and adjust gasoline engines.
126. Operate, maintain and adjust diesel engines.
127. Plan, install and adjust water or sewage systems.
128. Knowledge of blueprints, space requirements and building materials for agricultural structures.
129. Plan, install, repair and maintain electrical systems.
130. Operate, maintain and adjust tractors, trucks, agricultural equipment and agricultural machinery.

(45) 131. Operate, maintain and adjust garden machines and equipment.
132. Arrange, organize and manage an agricultural shop facility.
133. Farm carpentry.
134. Concrete, masonry and tile skills.
135. Knowledge of fuels and lubricants.
136. Planning for efficient use of buildings and equipment.
137. Install and use materials handling equipment.
138. Construct and maintain greenhouses, headhouses, pathhouses, or toolsheds.
139. Knowledge of paint and painting.
140.

(46) 141.
142.
143.
144.
145.
146.
147.
148.
149.
150.

Animal Science

(48) 151. Select and secure quality stock.
152. Housing and handling.
153. Feeding requirements and practices.
154. Knowledge of breeding principles and practices.
155. Sanitation and disease control practices.
156. Keep production, breeding and financial records.
157. Use records to improve feeding, breeding and other practices.
158. Produce high quality products.
159. Knowledge of grades and standards.
160. Ability to test animal products.

(49) 161. Knowledge of markets and marketing practices.
162. Cut meat.
163.
164.
165.
166.
167.
168.
169.
170.

II. Proportion of Time a Typical Worker with this Job Title Spends on Tasks Requiring the Agricultural Competencies Circled Above.

Directions: Record to nearest whole number.

_________ Per Cent

III. Essential Characteristics of Employees Holding this Job Title.

A. Minimum Educational Level (check (✓) one only)

_____1. Not important.

_____2. Less than high school graduation.

_____3. High school graduation.

_____4. Post-high school technical education. (not a degree)

_____5. Associate or junior college degree.

_____6. Some college education (not a degree).

_____7. Baccalaureate degree.

_____8. Master's degree.

_____9. Doctor's degree.

B. Residential and Experience Background (check (✓) one only)

_____1. Farm

_____2. Rural, non-farm

_____3. Urban

_____4. Not important

C. Leadership and Personality Qualities (check only those which are essential to successful performance on this job title).

_____1. Ability to accept and carry out responsibility.

_____2. Ability to meet people graciously and discuss problems effectively.

_____3. Ability in public speaking.

_____4. Ability to conduct a meeting.

C. Continued

_____5. Attitude of loyalty to employer.

_____6. Have initiative and favorable attitude towards work.

_____7. Ability to give a demonstration.

_____8. Acceptable personal grooming and appearance.

_____9. Ability to get along well with people.

IV. Hours and Wages Common to this Job Title in this Business or Service (WHOLE NUMBERS ONLY).

Employment Status	Average Hours Paid Per Week	Average Weeks Paid Per Year	Wages Per Week Beginning	Wages Per Week Highest
Full-time	_____1.	_____2.	_____3.	_____4.
Part-time	_____5.	_____6.	_____7.	_____8.

V. How are persons employed in this job title usually given advancement in this business or service? Check (√) only one answer.)

_____1. Salary increases only.

_____2. More responsibility within this job title only.

_____3. Both 1 and 2.

_____4. Promotion to another job title.

_____5. Not given advancement.

_____6. Proprietor, does not apply.

REMINDER: Staple to FORM B, SECTION I completed for this job title in this business or service. Your marks at the top of the pages will aid you in matching these forms.

APPENDIX B

I. B. M. DATA CARD CODING FORMAT

Column No.	
1-2	School district code no.
3-5	Business identification no.
6-7	Primary function of business
8-9	Secondary function of business
10-13	Job title code no.
14	Level of employment
15-16	No. full-time employees this year
17-18	No. full-time employees expected in five years
19-20	No. years full-time employee stays in this job title
21-22	No. part-time employees this year
23-24	No. part-time employees expected in five years
25-26	No. years part-time employee stays in this job title
27-32	Plant science competencies
33-39	Forestry, conservation and outdoor recreation competencies
40-43	Agricultural business management competencies
44-47	Agricultural mechanics competencies
48-50	Animal science competencies
51-53	Per cent of time spent doing these competencies
54	Minimum education needed
55	Residential and experience background
56	Leadership and personality qualities
57-59	Full-time average hours paid per week
60-61	Full-time average weeks paid per year
62-64	Full-time wages paid per week (beginning)
65-67	Full-time wages paid per week (highest)
68-70	Part-time average hours paid per week
71-72	Part-time average weeks paid per year
73-75	Part-time wages paid per week (beginning)
76-78	Part-time wages paid per week (highest)
79	Way employee is usually given advancement
80	

APPENDIX C

PREPARATION OF TABLES

TABLE II

PROPORTION OF TIME DEVOTED TO USE OF AGRICULTURAL COMPETENCIES IN TWELVE FAMILIES OF OFF-FARM AGRICULTURAL OCCUPATIONS

1. Mean "proportion of time . . . " was computed for each job title.
2. Mean of job title means was computed for each occupational family using the number of workers in each job title as weights.

TABLE III

PROJECTED NUMBER OF PERSONS EMPLOYED DURING 1964 IN OFF-FARM AGRICULTURAL OCCUPATIONS IN NEW YORK SCHOOL DISTRICTS OFFERING INSTRUCTION IN AGRICULTURE, 1963-64

1. Projected 260 districts = (actual number/job title/type of farming X projection factor for type of farming)
2. Projection factor $= \dfrac{\text{Number of school districts offering agriculture in a given type of farming area}}{\text{Number of school districts in sample from the same type of farming area}}$

Example: $\dfrac{\text{180 school districts in dairy area}}{4} = 45$

TABLE IV

CLASSIFICATION OF FULL-TIME WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS BY LEVELS OF EMPLOYMENT

1. Modal level of employment was determined for each job title.
2. Number of workers in each job title was plugged into TABLE II at modal level of employment.

TABLE V

CLASSIFICATION OF PART-TIME WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS BY LEVELS OF EMPLOYMENT

Same procedure as TABLE IV

TABLE VI

PROJECTED NUMBER OF PERSONS EMPLOYERS PREDICT WILL BE EMPLOYED IN 1969 IN OFF-FARM AGRICULTURAL OCCUPATIONS IN NEW YORK SCHOOL DISTRICTS OFFERING INSTRUCTION IN AGRICULTURE DURING 1963-64

1. Projected 260 districts = Number of workers predicted by employers in each job title by type of farming X projection factor for type of farming.

2. Projection factor $= \dfrac{\text{Number of school districts offering agriculture in a given type of farming}}{\text{Number of school districts in sample from the same type of farming area}}$

TABLE VII

(See next page)

TABLE IX

MINIMUM EDUCATION REQUIRED FOR OFF-FARM AGRICULTURAL OCCUPATIONS

1. The mode for each job title was determined.
2. The number of workers in each job title was plugged into TABLE IX.
3. Numbers were converted to proportion.

TABLE VII

EMPLOYMENT OPPORTUNITIES OUTLOOK IN OFF-FARM AGRICULTURAL OCCUPATIONS IN 260 SCHOOL DISTRICTS OFFERING AGRICULTURAL INSTRUCTION, 1963-64

Agricultural Machinery Sales and Service	No. of Positions		C	D	E	Turnover by years					Employment opportunities by years				
	A	B				F	G	H	I	J					
Job Titles	Actual 1964	Predicted 1969	Annual growth (B-A) ÷ 5	Mean years on job	Turnover rate 1 ÷ D	1965 (A+C)E	1966 (A+2C)E	1967 (A+3C)E	1968 (A+4C)E	1969 (A+5C)E	1965 C+F	1966 C+G	1967 C+H	1968 C+I	1969 C+J
0101	40	60	4	10	.10	4.4	4.8	5.2	5.6	6.0	8.4	8.8	9.2	9.6	10
0102															
0103															
0104															
0105															
0106															
0107															
0108															
0109															
0110															
0111															
0112															
0113															
0114															
0115															
0116															
0117															
0118															
Totals	4879	6181	---	---	---	272	286	300	314	328	533	547	560	574	588

APPENDIX D

COMPETENCIES NEEDED BY WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS

1. Frequency of subscription to each competency by employers was tabulated by job titles.

2. Those competencies subscribed to by fewer than 50 per cent of employers were regarded as not needed by employees in a given job title.

3. In the case of these competencies subscribed to by 50 per cent or more of employers, the number of workers in each job title were plugged into TABLE VII.

4. Number was converted to proportion.

APPENDIX D
COMPETENCIES NEEDED BY WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS IN 16 SCHOOL DISTRICTS OFFERING INSTRUCTION IN AGRICULTURE, 1963-64

Agricultural competencies	Per cent of full-time workers by occupational families, needing this competency											
	(1) *	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Plant Science												
1. Sample soil for complete test.		2.4			7.1		8.0	18.1	3.2	40.5		22.4
2. Perform ph or nutrient tests.		2.4			7.1		8.5	18.1		35.1		22.4
3. Make lime or fertilizer recommendations.		2.7			7.1		8.5	27.3	3.2	54.2		23.3
4. Recommend soil management practices.		2.6			7.1		8.5	27.3	3.2	38.9		23.2
5. Decide what to grow.		2.6			7.1		8.5	27.3	6.5	51.1		2.3
6. Choose proper planting sites.		2.4			7.1		10.2		6.5	54.2		23.3
7. Mix soil composites.		2.4			7.1					48.9		1.6
8. Sterilize soil.		2.4			7.1			18.1		26.7		.4
9. Select varieties.		2.6			7.1		8.5	18.1	16.1	51.1		22.8
10. Select seed, cuttings, bulbs or stock plants.		2.6			7.1		22.7	27.3	17.7	51.1		23.2
11. Prepare seed beds.		.4			7.1		2.3	27.3	43.5	86.3		23.2
12. Select and use appropriate plant propagation methods.		.4			7.1		8.0	27.3	8.1	40.5		1.9
13. Determine proper rooting medium.		.4						18.1	6.5	40.5		1.2
14. Plant seeds, bulbs, trees or shrubs.		.5					4.0	27.3	43.5	86.3		2.9
15. Perform proper tillage practices.		.4		3.1	7.1		8.5	27.3	45.2	86.3		23.0
16. Control birds and animals injurious to plants.		2.5							9.7	43.5		1.9

---

* Key to occupational families: (1) Agr. Machinery Sales & Service, (2) Agr. Supplies & Equipment, (3) Dairy Manufacturing & Processing, (4) Livestock Marketing & Processing, (5) Other Livestock Industry, (6) Poultry Industry, (7) Crops Marketing & Processing, (8) Forestry & Soil Conserv., (9) Wildlife & Recreation, (10) Ornamental Horticulture, (11) Farm Service and (12) Agricultural Service

COMPETENCIES NEEDED BY WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS
IN 16 SCHOOL DISTRICTS OFFERING INSTRUCTION IN AGRICULTURE, 1963-64

Agricultural competencies	Per cent of full-time workers by occupational families, needing this competency											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Plant Science (cont'd)												
17. Control insects, diseases and weeds.		2.5			7.1		10.2	27.3	45.2	73.3	16.1	24.1
18. Manage greenhouse, provide proper environment, forcing and shading.								18.1		37.4		
19. Manage nursery, planting, transplanting, pruning, shaping and trimming.		.1						27.3	1.6	63.4		2.1
20. Design and make flower arrangements, corsages, floral pieces and Christmas decorations.										27.5		1.6
21. Knowledge of characteristics and appropriate use of landscaping materials.		.1							38.7	48.9		2.3
22. Design landscaping plans to effectively use trees, shrubs, lawn, foundation plantings, vines and ground covers, annual and perennial flowers.									9.7	38.2		2.3
23. Correct physical defects of sites being landscaped.									48.4	55.0		1.8
24. Locate and design drives, walks, fences.					7.1			27.2	58.1	51.9		1.5
25. Establish lawns.	.3	.5			7.1				58.1	39.7		2.1
26. Maintain lawns.	.9	.5			7.1				12.9	64.1		2.1

COMPETENCIES NEEDED BY WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS
IN 16 SCHOOL DISTRICTS OFFERING INSTRUCTION IN AGRICULTURE, 1963-64

Agricultural competencies	Per cent of full-time workers by occupational families, needing this competency											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Plant Science (cont'd)												
27. Maintain trees and shrubs.		.5			7.1			27.2	8.1	66.4		3.5
28. Provide seasonal protection to ornamental plants.		.1								51.9		2.1
29. Harvest crops or plants.		.4		3.1	7.1		10.2	27.2	1.6	43.5		2.9
30. Process, grade or package.		.9		2.1			63.1	27.2		39.7		2.3
31. Shipping or storing.		.9		5.2	7.1		47.7	18.2		16.0		2.3
32. Marketing grains.					7.1		1.7	9.1				
33. Knowledge of grains and standards.												
34. Identify and control acquatic plants.												
35. Knowledge of soil textures.												
36. Mix herbicides and insecticides.												
37. Control plants injurious to animals.												
Forestry, Conservation and Outdoor Recreation												
41. Identify trees of economic importance.								100	9.7			2.7
42. Reforest an area.								27.3	3.2			1.9
43. Manage reforested area.								27.3	9.7	3.1		2.1
44. Manage Christmas tree plantations.												2.1
45. Select and mark trees for cutting.								46.5	3.2			1.6
46. Estimate volume and tree stands.								45.5	8.1			2.1
47. Identify and control common insects and diseases.		.4						54.5	11.3	5.3		2.9
48. Construct and maintain fire lanes.								27.3	6.5			1.2

COMPETENCIES NEEDED BY WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS IN 16 SCHOOL DISTRICTS OFFERING INSTRUCTION IN AGRICULTURE, 1963-64

Agricultural competencies	Per cent of full-time workers by occupational families, needing this competency											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Forestry, Conservation and Outdoor Recreation (cont'd)												
49. Use fire fighting tools and equipment.								27.3	40.3			1.8
50. Detect and report forest fires.									19.4			1.2
51. Organize a fire crew.								27.3	14.5			
52. Read a topographical map									21.0	7.6		2.7
53. Scale and grade saw logs.								45.5	8.1			1.2
54. Fell, trim, skid and haul logs and pulp.								72.7	1.6	4.6		1.2
55. Operate chain saws and other power equipment.		.1						72.7	35.5	4.6		6.0
56. Cut, bail, load, grade and haul Christmas trees.												.4
57. Saw, grade, store and haul lumber.								72.7				1.2
58. Tap trees and operate maple syrup production equipment.												1.2
59. Control soil erosion.								18.2	4.8	9.2		2.5
60. Determine land use capabilities.									1.6	10.7		2.1
61. Repair and maintain tree planting equipment.								27.3	1.6			1.2
62. Maintain fire fighting tools and equipment.								27.3	8.1			
63. Lay out, build and open woods roads.								72.7	9.7			
64. Select, repair and maintain chain saws.	.3							72.7	24.2	4.6		1.2
65. Maintain and repair turf equipment such as mowers, fertilizer spreaders and irrigation equipment.	.3							27.3	27.4	6.1		1.8

COMPETENCIES NEEDED BY WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS IN 16 SCHOOL DISTRICTS OFFERING INSTRUCTION IN AGRICULTURE, 1963-64

Agricultural competencies	Per cent of full-time workers by occupational families, needing this competency											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Forestry, Conservation and Outdoor Recreation (cont'd)												
66. Maintain and repair ski tows and lifts.												.4
67. Maintain and repair boats and motors.	.3							27.3	32.3			.4
68. Identify economically important wildlife species.								27.3	12.9			1.9
69. Trap and control nuisance wildlife.								27.3	12.9	4.6		1.6
70. Provide habitat for bird and animal life.								27.3	16.1	1.5		1.9
71. Stock streams and ponds.								27.3	22.6			1.6
72. Manage wildlife in confinement.								27.3	19.4			1.2
73. Know game laws.								27.3	35.5			2.9
74. Manage streams and ponds.								27.3	32.3			1.9
75. Keep essential records.	.3							27.3	43.5	3.1		2.9
76. Know public health laws.								27.3	43.5	1.5		22.8
77. Know insurance and safety regulations.								27.3	77.4	7.6		23.3
78. Manage camp grounds and trailer camps.									51.6			1.6
79. Care for riding horses.									21.0			1.6
80. Know fishing and hunting skills.									27.4			
81. Operate turf equipment such as mower, fertilizer spreaders and irrigation equipment	.3	.1							62.0	14.5		4.1
82. Manage ski tow slopes and trails									3.2			1.2
83. Layout and maintain hiking trails.					10.7				16.[illegible]			1.4

COMPETENCIES NEEDED BY WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS IN 16 SCHOOL DISTRICTS OFFERING INSTRUCTION IN AGRICULTURE, 1963-64

Agricultural competencies	Per cent of full-time workers by occupational families, needing this competency (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Forestry, Conservation and Outdoor Recreation (cont'd)												
84. Operate boats and motors.	.9	1.4			10.7				27.4			4.5
85. Maintain riding trails.												
86. Give riding instruction.												
87. Organize group games.												
88. Organize entertainment.												
89. Know and perform life-guard duties.		1.9										
90. Determine water use capabilities.												
1. Maintain and repair boat coverings.												
2. Layout and maintain bridle paths.												
Agricultural Business Management												
91. Plan and arrange for advertising and promotion.	29.1	24.1	12.9	30.2	17.9		15.3	45.5	25.8	26.0	25.8	37.2
92. Handle inventories, stock control, warehousing reports, payrolls, accounts.	28.5	28.7	17.4	21.9	17.9	33.3	20.5	63.6	38.7	26.7	12.9	40.9
93. Sell machinery, equipment, materials, products or supplies.	77.8	38.0	13.5	16.7	28.6		21.0	45.5	14.5	29.0		8.9
94. Solicit subscribers to various types of agricultural service.	28.5	15.1								2.3	38.7	19.8
95. Make job estimates.	78.8	30.9		25.0			4.0	45.5	9.7	37.4	16.1	31.3
96. Purchase goods to sell.	40.2	25.8	13.5	13.5	57.1		15.3	45.5	19.4	34.4	6.5	21.8
97. Supervise installation of equipment.	29.4	23.0	14.0	12.5	10.7	33.3	19.3	45.5	14.5		6.5	14.6

COMPETENCIES NEEDED BY WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS IN 16 SCHOOL DISTRICTS OFFERING INSTRUCTION IN AGRICULTURE, 1963-64

Agricultural competencies	Per cent of full-time workers by occupational families, needing this competency											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Agricultural Business Management (cont'd)												
98. Hire, train and supervise workers.	17.1	18.6	16.9	46.9	67.9		19.3	63.6	33.9	40.5	9.7	26.3
99. Call on prospective customers.	29.1	26.0	10.1	27.1	10.7		21.0	45.5	12.9	33.6	54.8	58.6
100. Investigate and adjust customer complaints.	32.6	36.1	10.7	31.3	14.3		21.0	45.5	32.3	37.4	61.3	63.6
101. Display, explain and demonstrate items for sale.	100	30.8	16.3	33.3	10.7		14.8	45.5	22.6	30.5	29.0	54.9
102. Order repair parts and new equipment.	83.9	29.6	16.9	14.6	28.6		16.5	45.5	41.9	32.8	35.5	24.9
103. Use legal instruments: wills, deeds, contracts, mortgages, notes.	35.4	17.8	10.7	15.6	42.8		23.9	45.5	4.6	33.6	6.5	54.5
104. Keep, summarize and analyze records.	65.5	29.2	55.6	15.6	57.1		23.9	63.6	17.6	28.2	58.1	69.8
105. Evaluate the total operation and make decisions.	14.9	17.0	16.9	12.5	67.9		21.0	63.6	29.0	26.7	29.0	66.3
106. Understand and use credit.	80.4	42.8	16.3	15.6	53.6		24.4	45.5	12.9	28.2	45.2	66.3
107. Comply with local, state and federal government trade and licensing regulations.	35.8	20.3	15.7	31.3	57.1		26.1	45.5	32.3	16.0	38.7	63.4
108. Provide for insurance.	21.8	15.8	10.1	14.6	53.6		18.8	45.5	46.8	25.2	32.3	64.6
109. Prepare tax returns.	21.8	14.5	10.7	14.6	53.6		18.2	45.5	38.7	34.4	32.3	35.4
110. Understand agriculture in our economy.	29.4	23.6	17.4	34.4	57.1		24.4	63.6	3.2	26.0	45.2	52.7
111. Conduct surveys.												
112. Organize and work with committees.												
113. Public speaking engagements.												

COMPETENCIES NEEDED BY WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS IN 16 SCHOOL DISTRICTS OFFERING INSTRUCTION IN AGRICULTURE, 1963-64

Agricultural competencies	Per cent of full-time workers by occupational families, needing this competency (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Agricultural Business Management (cont'd)												
114. Make appraisals.												
115. Know principals of delivering to customers.												
116. Knowledge of marketing.)												
117. Knowledge of grades and standards.) crops												
Agricultural Mechanics												
121. Select and buy farm machinery or garden tools, equipment and machinery.	13.6	2.1	.6	5.2	7.1			45.5	43.5	37.4	22.6	6.0
122. Select, buy, adjust or maintain lawn and garden sprinkler and irrigation equipment.		12.7			7.1			9.1	32.3	48.9	6.5	2.1
123. Woodworking or metal working tool skills.	51.3	39.3	3.4	8.3	7.1				40.3	31.3	58.1	32.5
124. Arc or oxy-acetylene welding abilities.	65.5	33.6	2.2	5.2			14.8	54.5	11.3	3.3	58.1	33.9
125. Operate, maintain and adjust gasoline engines.	63.6	64.3	2.2	8.3	7.1		20.5	54.5	62.9	74.0	58.1	32.8
126. Operate, maintain and adjust diesel engines.	56.3	43.8	2.2				14.8	45.5	1.6			12.1
127. Plan, install and adjust water or sewage systems.	.3	2.7	3.4				14.8		22.6	18.3	16.1	8.8
128. Knowledge of blueprints, space requirement and building materials for agricultural structures.		39.7	23.0		7.1		18.2	45.5	11.3	27.5	41.9	18.3
129. Plan, install, repair and maintain electrical systems.	4.1	17.7	9.6				13.1	45.5	11.3	13.7		15.4

COMPETENCIES NEEDED BY WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS IN 16 SCHOOL DISTRICTS OFFERING INSTRUCTION IN AGRICULTURE, 1963-64

Agricultural competencies	Per cent of full-time workers by occupational families, needing this competency											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Agricultural Mechanics (cont'd)												
130. Operate, maintain and adjust tractors, trucks, agricultural equipment and agricultural machinery.	62.0	37.3	30.9	5.2	7.1		29.0	54.5	54.8	54.2	61.3	33.7
131. Operate, maintain and adjust garden machines and equipment.	45.3	14.1		3.1			12.5		53.2	73.3	41.9	10.3
132. Arrange, organize and manage an agricultural shop facility.	16.1				7.1				1.6		6.5	1.6
133. Farm carpentry.		6.8	2.2	8.3	7.1		13.1	54.5	43.5	31.3		5.8
134. Concrete, masonry and tile skills.		10.2	3.4		7.1		13.1		43.5	18.3		10.9
135. Knowledge of fuels and lubricants.	61.7	26.8	7.3	5.2	7.1		17.0	45.5	43.5	42.0	9.7	32.9
136. Planning for efficient use of buildings and equipment.	1.3	7.2	15.7		7.1		15.9	54.5	25.8	3.1	6.5	14.4
137. Install and use materials handling equipment.	16.1	43.3	5.1	3.1	17.9		15.9	45.5	6.5	10.7		5.6
138. Construct and maintain greenhouses, headhouses, pathhouses, or toolsheds.	.3			5.2					17.7	26.0		3.7
139. Knowledge of paint and painting.	45.9	11.6			7.1		14.8	54.5	48.4	55.0	41.9	30.2
140. Knowledge of hydraulic systems.			14.0						9.7			1.2
141. Use a transit, etc.												
142. Knowledge of refrigeration.												
143. Knowledge of types of metals.												
144. Use micrometers.												

COMPETENCIES NEEDED BY WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS IN 16 SCHOOL DISTRICTS OFFERING INSTRUCTION IN AGRICULTURE, 1963-64

Agricultural competencies	Per cent of full-time workers by occupational families, needing this competency (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Agricultural Mechanics (cont'd)												
145. Set up and operate metal working machines.		.1										
146. Blacksmith skills (farrier).												
147. Know how to load and unload machinery (from vehicles).												
Animal Science												
151. Select and secure quality stock.		.4		13.5	46.4				1.6	5.3	35.5	4.9
152. Housing and handling.		.4	1.7	20.8	85.7				9.7	5.3	16.1	4.5
153. Feeding requirements and practices.		1.3	1.7	20.8	85.7				9.7	1.5	12.9	4.5
154. Knowledge of breeding principles and practices.		.5		12.5	82.1				3.2	5.3	35.5	4.3
155. Sanitation and disease control practices.		.4	53.9	50.0	100	33.3			3.2	6.9	38.7	4.7
156. Keep production, breeding and financial records.		.5	1.7	12.5	92.9				3.2	5.3	35.5	9.7
157. Use records to improve feeding, breeding and other practices.		.8	10.1	12.5	85.7				3.2		35.5	4.5
158. Produce high quality products.		.8	34.8	12.5	96.4	33.3			3.2		12.9	3.7
159. Knowledge of grades and standards.		.8	25.2	63.5	96.4					6.9	12.9	4.5
160. Ability to test animal products.		.4	25.8	25.0	100						12.9	3.7
161. Knowledge of markets and marketing practices.		4.3	10.1	79.2	92.9		5.7		4.8		12.9	11.7
162. Cut meat.				47.9	35.7				3.2			1.9

COMPETENCIES NEEDED BY WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS IN 16 SCHOOL DISTRICTS OFFERING INSTRUCTION IN AGRICULTURE, 1963-64

Agricultural competencies	Per cent of full-time workers by occupational families, needing this competency											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Animal Science (cont'd)												
163. Pasteurize milk.				3.1								
164. Make cheese.				3.1								
165. Make ice cream.												
166. Transferring livestock (legal).												.2
167. Interpreting records (classification).												.2
168. Operate bottling machines.												
169. Ability to grade and candle eggs.												.4
170. Operate debeaking equipment.												
1. Shoe horses.												
2. Clip horses.												

APPENDIX E

COMPETENCIES NEEDED BY WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS IN TWO SCHOOL DISTRICTS IN THE ADIRONDACK AREA

Agricultural competencies	Per cent of full-time workers by occupational families, needing this competency											
	(1) *	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Plant Science												
1. Sample soil for complete test.								17.1	.9	66.7		2.8
2. Perform ph or nutrient tests.									.9	66.7		2.8
3. Make lime or fertilizer recommendations.								7.3	.9	66.7		2.8
4. Recommend soil management practices.								4.9	9.7	66.7		2.8
5. Decide what to grow.								12.2	10.6	33.3		2.8
6. Choose proper planting sites.								36.6	.9	33.3		2.8
7. Mix soil composites.								17.1		100		2.8
8. Sterilize soil.								17.1		100		2.8
9. Select varieties.								22.0	.9	66.7		2.8
10. Select seed, cuttings, bulbs or stock plants.								17.1		66.7		2.8
11. Prepare seed beds.								17.1	1.8	100		2.8
12. Select and use appropriate plant propagation methods.									9.7	100		2.8
13. Determine proper rooting medium.								4.9		100		2.8
14. Plant seeds, bulbs, trees or shrubs.								36.6	.9	100		2.8
15. Perform proper tillage practices.									2.7	100		2.8

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* Key to occupational families: (1) Agr. Machinery Sales & Service, (2) Agr. Supplies and Equipment, (3) Dairy Manufacturing & Processing, (4) Livestock Marketing & Processing, (5) Other Livestock Industry, (6) Poultry Industry, (7) Crops Marketing & Processing, (8) Forestry & Soil Conserv., (9) Wildlife & Recreation, (10) Ornamental Horticulture, (11) Farm Service and (12) Agricultural Service.

COMPETENCIES NEEDED BY WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS IN TWO SCHOOL DISTRICTS IN THE ADIRONDACK AREA

Agricultural competencies	Per cent of full-time workers by occupational families, needing this competency (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Plant Science (cont'd)												
16. Control birds and animals injurious to plants.								19.5	.9			5.6
17. Control insects, diseases and weeds.								36.6	5.3	66.7		8.4
18. Manage greenhouse, provide proper environment, forcing and shading.								17.1		66.7		
19. Manage nursery, planting, transplanting, pruning, shaping and trimming.								41.5		66.7		
20. Design and make flower arrangements, corsages, floral pieces and Christmas decorations.										100		
21. Knowledge of characteristics and appropriate use of landscaping materials.								22.0	11.5	66.7		5.6
22. Design landscaping plans to effectively use trees, shrubs, lawn, foundation plantings, vines and ground covers, annual and perennial flowers.								22.0		66.7		2.8
23. Correct physical defects of sites being landscaped.								22.0	11.5	33.3		2.8
24. Locate and design drives, walks, fences.								17.1	.9	33.3		2.8
25. Establish lawns.								22.0	1.8	33.3		2.8
26. Maintain lawns.								22.0	1.8	100		52.8
27. Maintain trees and shrubs.								51.2	2.7	100		52.8
28. Provide seasonal protection to ornamental plants.								26.8		100		2.8
29. Harvest crops or plants.								19.5		100		
30. Process, grade or package.										100		

COMPETENCIES NEEDED BY WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS
IN TWO SCHOOL DISTRICTS IN THE ADIRONDACK AREA

Agricultural competencies	Per cent of full-time workers by occupational families, needing this competency (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Plant Science (cont'd)												
31. Shipping or storing.										100		36.1
32. Marketing grains.												
33. Knowledge of grains and standards.												
34. Identify and control acquatic plants.												
35. Knowledge of soil textures.												
36. Mix herbicides and insecticides.												
37. Control plants injurious to animals.												
Forestry, Conservation and Outdoor Recreation												
41. Indentify trees of economic importance.								80.5	32.7	33.3		19.4
42. Reforest an area.								24.4	15.9			
43. Manage reforested area.								41.5	22.1			2.8
44. Manage Christmas tree plantations.								26.8	9.7			2.8
45. Select and mark trees for cutting.								11.5	18.6			2.8
46. Estimate volume and tree stands.								31.7	9.7			2.8
47. Identify and control common insects and diseases.								43.9	17.7	66.7		5.6
48. Construct and maintain fire lanes.								34.1	20.4			2.8
49. Use fire fighting tools and equipment.		25						80.5	61.9			63.9
50. Detect and report forest fires.								70.7	37.2			22.2
51. Organize a fire crew.								63.4	29.2			38.9

COMPETENCIES NEEDED BY WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS IN TWO SCHOOL DISTRICTS IN THE ADIRONDACK AREA

Agricultural competencies	Per cent of full-time workers by occupational families, needing this competency (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Forestry, Conservation and Outdoor Recreation (cont'd)												
52. Read a topographical map.								68.3	28.3	33.3		36.1
53. Scale and grade saw logs.								48.8	14.2			5.6
54. Fell, trim, skid and haul logs and pulp.								68.3	45.1			2.8
55. Operate chain saws and other power equipment.		25						78.0	53.1	66.7		55.6
56. Cut, bail, load, grade and haul Christmas trees.								19.5	8.8			2.8
57. Saw, grade, store and haul lumber.								19.5	14.2			19.4
58. Tap trees and operate maple syrup production equipment.									14.2			2.8
59. Control soil erosion.								26.8	24.8	33.3		38.9
60. Determine land use capabilities.								43.9	21.9	66.7		5.6
61. Repair and maintain tree planting equipment.								46.3	10.6			2.8
62. Maintain fire fighting tools and equipment.		25						73.2	48.7			55.6
63. Lay out, build and open woods roads.								58.5	23.9			2.8
64. Select, repair and maintain chain saws.		25						58.5	26.5			22.2
65. Maintain and repair turf equipment such as mowers, fertilizer spreaders and irrigation equipment.								22.0	6.2	100		55.6
66. Maintain and repair ski tows and lifts.									8.0			5.6
67. Maintain and repair boats and motors.								19.5	51.3			2.8

COMPETENCIES NEEDED BY WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS IN TWO SCHOOL DISTRICTS IN THE ADIRONDACK AREA

Agricultural competencies	Per cent of full-time workers by occupational families, needing this competency											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Forestry, Conservation and Outdoor Recreation (cont'd)												
68. Identify economically important wildlife species.								17.1	25.7			2.8
69. Trap and control nuisance wildlife.								7.3	29.2			2.8
70. Provide habitat for bird and animal life.								17.1	20.4			2.8
71. Stock streams and ponds.								7.3	13.3			
72. Manage wildlife in confinement.								7.3	13.3			
73. Know game laws.								39.0	33.6			5.6
74. Manage streams and ponds.			100					7.3	17.7			5.6
75. Keep essential records.		25	100					90.2	47.8	33.3		33.3
76. Know public health laws.			100					46.3	35.4			52.8
77. Know insurance and safety regulations.		25	100					65.9	44.2	33.3		75.0
78. Manage camp grounds and trailer camps.			100					19.5	25.7			5.6
79. Care for riding horses.									4.4			
80. Know fishing and hunting skills.								29.3	23.0			2.8
81. Operate turf equipment such as mower, fertilizer spreaders and irrigation equipment.								24.4	12.4	100		58.3
82. Manage ski tow slopes and trails.									1.8			5.6
83. Layout and maintain hiking trails.								9.8	13.3			2.8
84. Operate boats and motors.								39.0	60.2			8.4
85. Maintain riding trails.												
86. Give riding instruction.												
87. Organize group games.									3.5			
88. Organize entertainment.									3.5			

COMPETENCIES NEEDED BY WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS IN TWO SCHOOL DISTRICTS IN THE ADIRONDACK AREA

Agricultural competencies	Per cent of full-time workers by occupational families, needing this competency											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Forestry, Conservation and Outdoor Recreation (cont'd)												
89. Know and perform lifeguard duties.												
90. Determine water use capabilities.									1.8			
1. Maintain and repair boat coverings.												33.3
2. Layout and maintain bridle paths.												
Agricultural Business Management												
91. Plan and arrange for advertising and promotion.		25						4.9	20.4	66.7		27.8
92. Handle inventories, stock control, warehousing reports, payrolls, accounts.		25						48.8	36.3	33.3		27.8
93. Sell machinery, equipment, materials, products or supplies.		25						4.9	4.4	100		14.0
94. Solicit subscribers to various types of agricultural service.								4.9				2.8
95. Make job estimates.		25						87.8	18.6			33.3
96. Purchase goods to sell.		25						4.9	14.2	100		14.0
97. Supervise installation of equipment.								24.4	22.1	33.3		11.2
98. Hire, train and supervise workers.		25	100					70.7	31.0	33.3		25.0
99. Call on prospective customers.		25						19.5	22.2	66.7		5.3

COMPETENCIES NEEDED BY WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS IN TWO SCHOOL DISTRICTS IN THE ADIRONDACK AREA

Agricultural competencies	Per cent of full-time workers by occupational families, needing this competency											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Agricultural Business Management												
100. Investigate and adjust customer complaints.		25						36.6	30.1	66.7		27.8
101. Display, explain and demonstrate items for sale.		25						12.2	14.2	100		19.4
102. Order repair parts and new equipment.		25						43.9	42.5	66.7		16.6
103. Use legal instruments: wills, deeds, contracts, mortgages, notes.		25	100					26.8	21.2	33.3		30.6
104. Keep, summarize and analyze records.		25	100					48.8	41.6	33.3		36.1
105. Evaluate the total operation and make decisions.		25	100					43.9	32.7	66.7		30.6
106. Understand and use credit.		25						26.8	18.6	66.7		27.8
107. Comply with local, state and federal government trade and licensing regulations.		25						41.5	34.5	66.7		22.2
108. Provide for insurance.		25						4.9	14.2	33.3		22.2
109. Prepare tax returns.		25						4.9	4.4	33.3		22.2
110. Understand agriculture in our economy.		25	100					65.9	31.9			13.9
111. Conduct surveys.												2.8
112. Organize and work with committees.												2.8
113. Public speaking engagements.												2.8
114. Make appraisals.												
115. Know principals of delivering to customers.												
116. Knowledge of marketing.)												
117. Knowledge of grades and standards.) crops												

COMPETENCIES NEEDED BY WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS IN TWO SCHOOL DISTRICTS IN THE ADIRONDACK AREA

Agricultural competencies	Per cent of full-time workers by occupational families, needing this competency (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Agricultural Mechanics												
121. Select and buy farm machinery or garden tools, equipment and machinery.		25						22.0	15.0	66.7		2.8
122. Select, buy, adjust or maintain lawn and garden sprinkler and irrigation equipment.		25						17.1	10.6	66.7		19.4
123. Woodworking or metal working tool skills.								22.0	48.7	100		36.1
124. Arc or oxy-acetylene welding abilities.								24.4	31.9			25
125. Operate, maintain and adjust gasoline engines.		25							70.8	100		66.7
126. Operate, maintain and adjust diesel engines.								70.7	11.5			8.3
127. Plan, install and adjust water or sewage systems.			100					2.4	61.9	66.7		30.6
128. Knowledge of blueprints, space requirement and building materials for agricultural structures.		25	100						31.0	33.3		30.6
129. Plan, install, repair and maintain electrical systems.								2.4	38.1	33.3		27.8
130. Operate, maintain and adjust tractors, trucks, agricultural equipment and agricultural machinery.								34.1	60.2	100		22.2
131. Operate, maintain and adjust garden machines and equipment.								24.4	62.0	100		55.6
132. Arrange, organize and manage an agricultural shop facility.		25						17.1	5.3	33.3		8.3
133. Farm carpentry.								17.1	64.6	33.3		30.6
134. Concrete, masonry and tile skills.			100					36.6	57.5			25.0

COMPETENCIES NEEDED BY WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS IN TWO SCHOOL DISTRICTS IN THE ADIRONDACK AREA

Agricultural competencies	Per cent of full-time workers by occupational families, needing this competency											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Agricultural Mechanics (cont'd)												
135. Knowledge of fuels and lubricants.		25						68.3	70.8	66.7		66.7
136. Planning for efficient use of buildings and equipment.		25	100					34.1	37.2	33.3		25.0
137. Install and use materials handling equipment.		25	100					22.0	18.6			25.0
138. Construct and maintain greenhouses, headhouses, pathhouses, or toolsheds.								17.1	17.1	100		22.2
139. Knowledge of paint and painting.		25	100					58.5	91.2	100		69.4
140. Knowledge of hydraulic systems.									.9			2.8
141. Use a transit, etc.								9.8				
142. Knowledge of refrigeration.												
143. Knowledge of types of metals.												
144. Use micrometers.												
145. Set up and operate metal working machines.												
146. Blacksmith skills (farrier).									8.8			
147. Know how to load and unload machinery (from vehicles).												
Animal Science												
151. Select and secure quality stock.									8.8			2.8
152. Housing and handling.			100					7.3	12.4			2.8
153. Feeding requirements and practices.			100					7.3	15.0			2.8
154. Knowledge of breeding principles and practices.								7.3	9.7			

COMPETENCIES NEEDED BY WORKERS IN OFF-FARM AGRICULTURAL OCCUPATIONS
IN TWO SCHOOL DISTRICTS IN THE ADIRONDACK AREA

Agricultural competencies	Per cent of full-time workers by occupational families, needing this competency (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Animal Science (cont'd)												
155. Sanitation and disease control practices.			100						7.1			58.3
156. Keep production, breeding and financial records.									.9			
157. Use records to improve feeding, breeding and other practices.								7.3	.9			
158. Produce high quality products.			100						5.3			2.8
159. Knowledge of grades and standards.			100						5.3			2.8
160. Ability to test animal products.			100						12.4			2.8
161. Knowledge of markets and marketing practices.			100						4.4			5.6
162. Cut meat.								7.3				
163. Pasteurize milk.												
164. Make cheese.												
165. Make ice cream.												
166. Transferring livestock (legal).												
167. Interpreting records (classification).												
168. Operate bottling machines.												
169. Ability to grade and candle eggs.												
170. Operate debeaking equipment.												
1. Shoe horses.												
2. Clip horses.												